

*Conference on Food Security
Measurement and Research:*

Papers and Proceedings

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FCS

**Food and Consumer Service
(formerly Food and Nutrition Service)
U.S. Department of Agriculture
Alexandria, Virginia**

AND

NCHS

**National Center for Health Statistics,
Centers for Disease Control and Prevention,
U.S. Department of
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**January 21-22, 1994
Washington, D.C.**



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January 21, 1994
Hotel Washington
Washington, D.C.**

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Executive Summary

Conference on Food Security Measurement and Research: Papers and Proceedings

The Conference on Food Security Measurement and Research, held in Washington, D.C. on January 21-22, 1994, was sponsored jointly by the USDA Food and Consumer Service (FCS) and the HHS National Center for Health Statistics (NCHS). It marks the opening of a major USDA/HHS initiative to develop and implement a state-of-the-art standardized survey instrument to measure prevalences of specific conditions of food insecurity and poverty-linked hunger in the U.S. population. The responsibility to develop and recommend such standard measures is assigned jointly to FCS and NCHS under the federal Ten-Year Comprehensive Plan for the National Nutrition Monitoring and Related Research Program (Activity V-C-2.4).

The present volume contains the full proceedings of the general conference: invited papers, presentations by invited speakers, floor discussion, and a set of post-conference technical papers commissioned by FCS from independent non-governmental experts to clarify and elaborate some of the basic technical issues developed in the conference. The purpose and objectives of the conference may be described as follows:

- o review the existing state of the art in operationalizing and measuring the dimensions of poverty-linked hunger and food insecurity in American households;
- o clarify and seek consistency in the terminology that has been used in discussing poverty-linked, i.e., resource-constrained, hunger and food insecurity;
- o explore the extent of consensus that has developed in the scholarly and research communities on the technical means of identifying and measuring resource-constrained food insecurity and hunger;
- o obtain advice on the next steps needed to create a state-of-the-art survey instrument and data base from which national prevalence measurements of food insecurity and hunger can be made; and
- o consider some of the implications for research that would result from a federal government effort to develop a standardized, annual national data set for the measurement of household-level hunger and food insecurity.

In the period following the January 1994 conference, the Food and Consumer Service has pursued an intensive effort to develop a state-of-the-art survey instrument to measure food insecurity and hunger within the general U.S. population, aided by advice from many experts both within and outside the federal government. In particular, the U.S. Bureau of the Census, Center for Survey Methods Research (CSMR) contributed substantially to the development, testing, and refinement of this instrument, which will be used for the first time in a new Food Security Supplement to the Bureau's Current Population Survey in April, 1995.

The present volume offers an introduction to the technical and scientific basis for measuring, on a national basis from the new CPS Supplement data, the prevalences of hunger and food insecurity at varying levels of severity within the U.S. population.

PREFACE

One of the bedrock elements of public health and social welfare policy in the United States since the Great Depression has been a national commitment to protect individuals and families in America from unwanted hunger. This commitment is evident in the nearly \$40 billion of Federal funds devoted annually to national programs of food assistance in the U.S. and in the mission statement of the Food and Consumer Service (formerly Food and Nutrition Service) of the U.S. Department of Agriculture:

"To alleviate hunger and to safeguard the health and well-being of the nation through the administration of nutrition education and domestic food assistance programs."

Notwithstanding this substantial national effort, poverty-linked hunger and food insecurity remain a problem for some persons and families and for America as a nation. For those who are directly affected, hunger may be experienced both in its direct form--sometimes or often simply not having enough to eat--and in its broader form of food insecurity--blocked or uncertain access to enough food for an active, healthy life, or to safe, wholesome and socially acceptable sources and types of food.

In continuing the commitment to address the problem of hunger and food insecurity in America, accurate knowledge of the sources, nature, and magnitude of these conditions takes on increased importance. While we know that these conditions exist for some portion of our population, we do not know with any confidence the dimensions of the problem. What is needed is a set of clear, operational definitions and reliable, authoritative measures of the prevalence of the conditions defined.

In recognition of this fact, the U.S. Department of Agriculture (USDA) and the Department of Health and Human Services (HHS) together have launched a major initiative to achieve better definition and measurement of the conditions of personal and household food security in the United States. The first step in this initiative was the decision to convene and co-sponsor the Conference on Food Security Measurement and Research held in Washington, D.C. on January 21-22, 1994.

This conference was organized by the USDA Food and Consumer Service and the HHS Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS) with the active participation of six other concerned Federal agencies. The conference was designed to bring together a large group of the leading academic, government, and technical experts who have worked in the specialized area of identifying and measuring hunger and other aspects of food insecurity. It was a technical conference, focused on issues of measurement and related research. Broader policy concerns relating

communities interested in problems of hunger and food insecurity in America. We expect the discussion around these issues to continue to be lively and we hope that the present volume will make a worthy contribution to that discussion. We believe that the volume can provide a valuable resource to anyone interested in the scientific and technical issues concerning the definition and measurement of hunger and food insecurity in America today.

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INTRODUCTION

Beginning in 1977, a basic question on household food sufficiency--developed by a working group composed of Betty Peterkin, Eleanor Pao, other USDA nutritionists and economists, and Mollie Orshansky of the Social Security Administration, Office of Research and Statistics--has been included in every national food-use survey conducted by the U.S. Department of Agriculture. This question, or a close variant, has now been asked in at least 12 national population surveys over more than 15 years.

The next important development in federal government concern for measuring food sufficiency and food security began in 1985 with the planning for the third National Health and Nutrition Examination Survey (NHANES III) in the Department of Health and Human Service's Centers for Disease Control and Prevention, National Center for Health Statistics (NCHS). Under the leadership of Dr. Ronette Briefel and Dr. Catherine Woteki, NHANES III incorporated the core of the USDA food-sufficiency question and six specific hunger-indicator items adapted from the instrument developed by Cheryl Wehler through the Community Childhood Hunger Identification Project (CCHIP). Subsequently, variants of these questions also were incorporated in the Extended-Measures-of-Well-Being Module included in the U.S. Bureau of the Census' Survey of Income and Program Participation (SIPP) and in the Food Stamp Cash-Out Study surveys conducted for the USDA Food and Consumer Service (FCS) by Abt Associates, Mathematica Policy Research, Inc., and The Urban Institute.

Beginning in 1992, FCS (then the Food and Nutrition Service) began a systematic study of the current literature on the definition and measurement of food insecurity and hunger. This was a first step in carrying out one of the responsibilities assigned jointly to FCS and NCHS under the recently formulated federal Ten-Year Comprehensive Plan for the National Nutrition Monitoring and Related Research Program: that is, to "Recommend a standardized mechanism and instrument(s) for defining and obtaining data on the prevalence of "food insecurity" or "food insufficiency" in the U.S. ..."

Several developments encouraged this effort. First, recent research, both government and private, had suggested persuasively the technical feasibility of making valid, scaled measurements of the constructs of hunger and food insecurity. Second, the concept of food security, which had appeared originally in the development literature for very low-income regions, was increasingly being applied, with appropriate adaptations, in the U.S. context. Third, a clear consensus appeared to be emerging within the concerned professional communities about the most appropriate conceptual definitions of hunger and food insecurity for wealthy countries, like the United States, in which some population groups nevertheless experience the need deprivations associated with poverty.

All these developments were well expressed in the special annual meeting of the American Institute of Nutrition (AIN) held in Charleston, South Carolina in December, 1989 and in the special report commissioned by AIN and prepared by the Life Sciences Research Office (LSRO) of the Federation of American Societies for Experimental Biology. This report, "Core Indicators of Nutritional State for Difficult to Sample Populations" (The Journal of Nutrition, v.120, November 1990 Supplement), was

particularly useful in presenting an authoritative expert definition of food security and insecurity for the U.S. context and in noting clearly the relationship of food insecurity to hunger and malnutrition:

"Food security was defined by the Expert Panel as access by all people at all times to enough food for an active, healthy life and includes at a minimum: a) the ready availability of nutritionally adequate and safe foods, and b) the assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing, and other coping strategies)."

"Food insecurity exists whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain."

"Hunger, in its meaning of the uneasy or painful sensation caused by a lack of food, and malnutrition are potential, although not necessary, consequences of food insecurity."

The 1989 LSRO conceptual definitions of food security, insecurity, and hunger provided a solid basis for the FCS/NCHS initiative to develop operational definitions of hunger and food insecurity appropriate for use in large-scale national population surveys. This effort was launched through an Interagency Working Group on Food Security Measurement formed by FCS and NCHS in 1992. This group met regularly throughout the following year to help plan the Conference on Food Security Measurement and Research reported in this volume and took an active part in the conference.

Working materials prepared for the conference included a schematic representation of our preliminary understanding of the domain of the food security concept. This schematic sought to relate the broad concept expressed in the LSRO conceptual definition to the available data and research bases from which equivalent operational definitions would be derived (Exhibit 1). Food security is important to people at all levels of living; however, as a public policy concern, a somewhat more limited domain has precedence. That is, food insecurity and hunger as particular aspects of poverty--as consequences of severe individual or family resource constraint--provided the focus for FCS' and NCHS' priority concerns in developing a reliable basis for measurement of these concepts.

This distinction also sets limits to the relevant hunger concept. We all are familiar with the physical sensation of hunger, "the uneasy or painful sensation caused by a lack of food." But simple hunger as such, which can be casual or voluntary in nature, does not define the object of public concern. Rather, the experience of families and individuals who because of inadequate resources are forced to "go hungry" gives the condition definition as a social problem. Hunger in this sense is usefully characterized as "resource-constrained" to emphasize its involuntary nature and relationship to poverty.

Exhibit 1

FCS FOOD-SECURITY SCHEMATIC

Relationships of Hunger and Other Elements of the Food-Security Concept, Phenomena, Indicators, and Measures for the Individual and Household Level

		BROAD FOOD-SECURITY CONCEPTS (including non-poverty-linked elements)				
		(psycho- logical)	(experi- ential)	(behav- ioral)	(social & cultural)	(physio- logical)
CONCEPT		Food Pre- ferences; (and Food Fears	Food Experience	Food Management	Food Meanings	Nutritional and Health Status
DOMAIN)						Food Safety
		SPECIFICALLY POVERTY-LINKED FOOD-SECURITY CONCEPTS				
		(perceptual & experiential)	(behav- ioral)	(social & cultural)	(physio- logical)	
PHENOM- ENON or CONDI- TION		"Food Sufficiency" Food quality dimension ("consumer preference") (Non-poverty linked)	"Hunger" (Resource-constrained) hunger & hunger anxiety experience	"Managing hunger" process; Coping efforts for food access & availability.	Social accept-ability of food sources; Cultural accept-ability of food.	Nutritional Adequacy and Food Safety (malnutrition and disease states) poverty-linked dietary & health problems Non-poverty linked dietary & health problems
EXTANT INDICATORS		Food Quality dimension of USDA Food Sufficiency indicator	Food Quantity dimension of USDA & NHANES Food Suffic'y indicator; Radimer hunger and anxiety questions; CCHIP food sufficiency & hunger items; NHANES-CCHIP hunger items.	CCHIP coping items; SIPP Well-Being-Module items; FNS Cashout Study items.	CCHIP attitudinal items; SIPP Well-Being-Module items; FNS Cashout Study items.	Household nutrient availabilities; Individual nutrient intakes; Food frequencies; Indicators of: Health status Disease Illness Dental health.
EXTANT MEASURES		Response frequency: "enough, but not the kinds of food we want to eat" (NFCS, CSFII, SIPP, & FCS Cashout data); Fraker-Schirm "dissatisfaction index" (FCS/MPR Cashout Study data).	Response frequency: "not enough to eat" (NFCS, CSFII, NHANES, SIPP); Radimer-Cornell "hunger scales" (small-sample data); Wehler "hunger/risk-of-hunger index" (multi-sample data); Fraker-Schirm "deprivation index" (FCS/MPR Cashout Study data).			(Nutrition measures: generally defined on population means or distributions in relation to expert norms.)

Another aspect of FCS' and NCHS' interest in the measurement of food insecurity and hunger is that the measures developed must be straightforward and relevant to public policy and policy makers. In particular, they need to be scaled measures, able to reflect variation in the level of severity of the condition observed. While the underlying constructs are complex and multi-dimensional, the emphasis for policy relevance falls initially upon the single dimension of relative severity.

Viewed in this light, a simple framework for measurement can be specified in which three distinct levels of severity are defined for the conditions of food insecurity observed in the data: (1) food insecurity short of actual hunger, (2) actual resource-constrained hunger for one or more adult members of the household, and (3) severe hunger, characterized by indicators of hunger among children in the household and/or by indicators of more frequent or severe adult hunger.

This simple framework suggests the kind of policy-relevant prevalence measures needed for hunger and food insecurity. Within this framework, conferees were asked to address the key questions of the feasibility and means of adapting the technical methods recently developed, primarily in the private sector, to the context of a nationally representative household population survey. This simplifying perspective, emphasizing relative levels of severity in a unidimensional sense, also proved useful for the conference in providing a simple common framework within which diverse particular formulations and emphases in visualizing hunger and food-insecurity concepts could be compared and, ultimately, reconciled.

The overriding aim of the conference was to identify the common ground existing in earlier research and to examine the problems and requirements involved in now moving toward a comprehensive version of a hunger and food-security survey instrument for a general population sample that would accurately represent the existing state-of-the-art in this area. We believe that this basic aim was fully realized by the conference.

For the government agencies involved, several important administrative and policy-related objectives can be served by standardized national prevalence measures for household food insecurity and hunger. Consistent annual national data on hunger and food insecurity, at several levels of severity, can be used to:

- o provide reliable estimates of the extent and location of hunger and hunger-risk conditions in the population;
- o demonstrate the links between hunger and nutritional and health status;
- o target program assistance to highest-risk population groups;
- o assess program impacts and monitor progress in reducing food insecurity and hunger.

In addition to the administrative and policy-related roles that standard annual national measures of hunger and food insecurity can play, we expect that these measures also will provide a useful new tool for research into the nature of these conditions.

Such measures can facilitate new research, for example, into both the causes and the consequences of resource-constrained hunger, helping to achieve both better understanding and more focused policies to ameliorate the condition. The two most important standard measurement tools so far available for this purpose--the national poverty income-line measures on the one hand and the strictly medical and biologically based measures of nutritional adequacy of diets on the other--have left an important gap. It is this gap that will be filled by the planned new measures.

Following the January conference, a series of meetings was held with representatives of the cooperating federal agencies and interested conference participants to further explore and develop the themes articulated in the conference. Additional analytic work was commissioned by FCS to clarify and expand on several conference presentations (Appendix A).

Beginning in February 1994, the U.S. Bureau of the Census entered into an interagency agreement with FCS to help develop, test, and refine a food security questionnaire for inclusion as a special supplement to the Bureau's April 1995 Current Population Survey (CPS). A Census Bureau team under the direction of Ronald Tucker, Chief, Current Population Survey Branch, and Dr. Elizabeth Martin, Director, Center for Survey Methods Research (CSMR), worked over an 11-month period to analyze, pretest, revise, field test, analyze, and revise again the survey instrument to be used in the April 1995 CPS Supplement. Technical direction of this extensive survey-method refinement effort was provided by Dr. Eleanor Singer, Institute for Social Research, Columbia University, and Bureau of the Census, CSMR.

A Census Bureau working group consisting of Maria Reed and Julie Feliciano, CPS Branch, and Eleanor Singer and Jennifer Hess, CSMR, met regularly and often over this period with the FCS working group consisting of Bruce Klein, Margaret Andrews, and Gary Bickel. The FCS group, in turn, consulted frequently throughout the process with Katherine Alaimo and Ronette Briefel, NCHS nutrition monitoring staff, who provided valuable insights through analyses of the 1988-91 NHANES III food-sufficiency data, and with the other members of the Interagency working group and the Conference Workshop expert group. The aim of all participants in this endeavor was to achieve the best possible survey instrument for producing a national data base from which valid and reliable scaled measures of food insecurity and hunger can be constructed.

The ultimate outcome of the Washington, D.C. Conference on Food Security Measurement and Research will be seen in the new data and measures which will result from this broad, cooperative undertaking, spanning an unusually broad spectrum of public and private efforts.

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Introduction: Welcome and Keynote Remarks

**Mike Fishman
Shirley Watkins
Linda Meyers
Jean-Pierre Habicht**

(The morning session opened at 8:38 a.m)

MIKE FISHMAN: Good morning. My name is Mike Fishman. I'm with the Food and Nutrition Service. I have the great pleasure to welcome you all here this morning to get us started on this important conference. I very much appreciate all of your being here. I know it's a special effort, given the terrible weather that we're facing outside, and it shows your special interest and commitment to the issues of hunger and food security that you are here today.

We are very fortunate to have with us today, to welcome us and help start our conference, Shirley Watkins, who is the Deputy Assistant Secretary for Food and Consumer Services with the Department of Agriculture. Shirley is a native of Hope, Arkansas, where she graduated from Yaeger High School. After completing a degree in home economics at the University of Arkansas at Pine Bluff, Shirley went to work for the University of Arkansas Agricultural Extension Service in Winn, Arkansas. This was followed by an illustrious career with the Memphis City Schools, where she first taught fourth grade, then junior-high home economics, then served as a food service supervisor, and finally was appointed Director of Nutrition Services. During her tenure with the Memphis school system, the nutrition program there was recognized nationally for its emphasis on quality service, training, nutrition education, and parental and community involvement. Meanwhile, Shirley also completed her master's degree in administration and supervision at Memphis State University and studied toward a doctoral degree in structural design.

In 1989, Ms. Watkins served as president of the 65,000-member American School Food Service Association and she has been a member of numerous other professional and social organizations. We're enormously pleased to have Shirley Watkins as our Deputy Assistant Secretary for Food and Consumer Services and we are especially pleased that she could join us here on this incredibly icy day. Shirley?

SHIRLEY WATKINS: It's a real honor to be here, and thank you, Mike, for that introduction. I am delighted to be able to join you on this icy morning.

This is a little unusual weather for people in this area, I understand. I'm from way down South and it sure is unusual for me, so I'm still in a thawing mood and I hope that most of you are, too. Some people are suffering from being cooped up in the house with children. I guess those of you who have little kids are glad to be here, too.

This is a very important conference. For those who planned the program, I'm sure that they are delighted to see you here, too.

This conference is particularly important when we're talking about hunger, and as we focus on trying to move forward, bringing together respected experts in the field of food security and hunger research who I see in this room today will certainly help to move the agenda forward.

When I think of all that happened in 1993 in the Department of Agriculture, even though I just arrived in November, we can see that food safety and nutrition issues hit the headlines of most newspapers and radio and television throughout the year. And when we look back at the floods and the people that we saw trying to salvage their farms and homes and their cities, then we can also look back and see the priorities that were established at USDA.

Last June, Secretary Espy invited hundreds of people to come inside the Beltway and join him in open dialogue to discuss hunger in this country. This set the stage for the hunger forums that are being held around the country. At that first forum, Secretary Espy said, and I quote, "Every day in the United States, there are seniors who wake up hungry. There are working people who are hungry all day long and children who go to bed hungry. At this hunger forum, we heard from those who have experienced hunger in their lives, from people who work to meet that need, and from those people who study the causes and impact of hunger and from those who work politically to do something about it."

The Secretary concluded in those remarks that there is much to be done, but we know that, together, we can beat hunger in America. Secretary Espy's recognition of the need to build strong coalitions and bring people together to tackle problems, to look for positive solutions, will certainly set the stage for implementation of the new USDA's position. There can be no question about the positive effects of the Nation's basic food assistance programs such as Food Stamps, the WIC Program, the School Lunch and School Breakfast Programs, the Summer Feeding Program, and the way that all of these programs help to feed hungry people in this country. These programs are desperately needed.

But that is only part of the battle. Providing food is not enough; there are a lot of other things that we need to be doing. The new issues of food security have moved awareness to the forefront that the issues are a lot broader than simply addressing hunger. That simply is not

reinvent the Department of Agriculture, a bureaucracy which in some respects has remained largely unchanged since it was founded by Abraham Lincoln. The Secretary's vision for a reorganized USDA recognizes that it is not enough for us to help produce food or even to distribute it better. We need to go far beyond that and re-invent our nutrition programs to promote healthful eating habits as part of establishing a firm foundation of food security for the country—and not only for the participants in all of our food programs, but for the Nation in general.

At the new USDA, nutrition has become a real priority. From all of the research that I have looked at and you have looked at over the years, the findings prove—as we heard during the child nutrition hearings on improving the school meals from the physicians and other health professionals that were there—that nutrition does have a direct link to the health and well-being of people.

In today's world we all are in the health care business. Whether we like it or not, that is our business. It is true of the food industry and it is true of the Department of Agriculture. We all have a significant role to play in the President's campaign to ensure the health security of every American. Good nutrition is good preventive medicine. We have been saying that in child nutrition programs for years, but we were talking to the choir. Now everybody seems to be buying into the concept.

A recent report by the American Heart Association shows that low-income Americans are at greatest risk of diet-related diseases. This report underscores our responsibility to the millions of families and individuals that we directly serve in the 14 food assistance programs. To move forward on food security and to document achievements in promoting eating habits that follow the dietary guidelines, and to meet the promise of the Hunger Forum and the Secretary's bold vision of a new USDA, we need detailed and authoritative measures of hunger and food security within our population.

That is why this conference is so important. And your role is critical, in acting to ensure that the needed measures are developed and put into place. Sound measures can help increase everyone's understanding of the nature of hunger and food insecurity and help pinpoint the location and the severity of hunger when it occurs. Better measures can help us to provide increased understanding of the problems that are associated with hunger and to develop more effective programs by helping us to make a clear assessment of our progress.

The availability to all Americans of adequate, healthy, and safe foods are important goals for this Administration. I am glad to look out here today and to see you here in such large numbers on a cold winter day in D.C. and to show your concern for helping people to become more informed.

Again, I would like to express our intent of working closely with you to assure that we can provide for a secure and healthy American population. I wish you much success in your conference throughout the weekend. Thank you very much.

MIKE FISHMAN: Thank you very much, Shirley, for those inspiring remarks. It really gets us off to an excellent start.

We're very lucky to have Linda Meyers with us today. Michael McGinnis got called up to the Hill unexpectedly, and Linda, who is his Acting Director for Nutrition Policy in the Department of Health and Human Services' Office of Disease Prevention and Health Promotion, is coming to sub for him. I can tell you, Linda is an enormously able sub and we're very happy to have her here today.

LINDA MEYERS: Good morning. Dr. McGinnis has asked me to extend the Department's warmest welcome to you all, and thanks to USDA for sharing the sponsorship of this conference with HHS, with our National Center for Health Statistics. Dr. McGinnis asked me to give you his sincerest regrets that he couldn't welcome you in person and share with you the Department's support of this activity.

This is a topic of longstanding concern and interest to him and to the Department. Among his many responsibilities as Deputy Assistant Secretary for Health for Disease Prevention and Health Promotion, Dr. McGinnis serves as Chair of the Department of Health and Human Services' Nutrition Policy Board. This is the departmental mechanism for coordinating nutrition policy formation. In that capacity, he has worked with colleagues at the National Center for Health Statistics to ensure the inclusion of a series of food sufficiency questions in the third National Health and Nutrition Examination survey, the NHANES III survey. He has funded an evaluation of core indicators of nutritional status in low-income populations that emphasized the need for better food-security measures, and he has encouraged and required inclusion of food-security issues in the Ten-Year Plan for National Nutrition Monitoring and Related Research and in the various nutrition-monitoring program activities under the plan. So, I know he was really disappointed that he couldn't be here. This Saturday was the one day when there was no health care reform hearing scheduled. That is, up until late Friday afternoon, none was scheduled. I got the word late yesterday that Dr. McGinnis had been called to report with all the other deputy assistant secretaries to the Secretary's office this morning, and they will go *en masse* to the Hill for health care reform hearings.

It is actually quite humbling to be here today, in the midst of all of you who have done so much work for such a long time in the food-security area, from advocacy and measurement and research perspectives. Ms. Watkins has done an eloquent job of stating the importance of food security measurement to public policy. I would like to be brazen enough to make three small observations, with the disclaimer that these are mine, these are not from Dr. McGinnis' prepared remarks or any guidance that he gave me on what to say.

First of all, I think we all recognize that measurement of food security and its components from definitional, conceptual, and technical perspectives is very complex. I think we're aware that this is an area that has benefitted only relatively recently from rigorous conceptual and methodological development. As recently as 1990, for example, the Life Sciences Research Office's (LSRO) expert panel on core indicators of nutritional status noted that food insecurity

may be widespread among population groups of nutritional concern that are inadequately represented in national health surveys. Thus, the extent of food insecurity has been unknown, partly because the surveys haven't reached all groups and partly because the definition is still being refined and the techniques for measurement are still being developed.

The LSRO expert panel also noted that research is needed on the validity of measures of food insecurity for all of the difficult-to-sample populations. Once measures of food insecurity are developed, they need to be standardized to provide comparability among findings from various surveys. Standardized measures of food insecurity would allow the examination of relationships among risk factors and potential consequences of food insecurity.

We also still have an unclear understanding of how food insufficiency, hunger, and malnutrition are related and how they relate to other health indicators. Until we do, obviously our advocacy and our program development and interventions won't be as effective as they might be. This conference offers a real opportunity to better understand and unravel the complexities of food insecurity and to set a course for the future.

A second point. Just as with the nutrition-related chronic diseases that are the major causes of death in the United States, a disproportionate burden of food insecurity is borne by the poor. We still don't know the precise prevalences nor, again, how it all relates to undernutrition or to obesity, for that matter. These linkages are particularly important to those of us working in the largest public health agency in the world.

This was among the reasons why—and this is the third observation—the Department has worked to ensure the inclusion of food sufficiency questions, adapted from the best available at the time, into NHANES III. We are pleased that the preliminary results from the first phase of NHANES III are becoming available. In fact, every time I talked to Dr. Briefel over the last week, she was diligently working to have something ready for today. I will find out whether she succeeded or not. These NHANES findings should provide useful benchmarks for future surveys, as well as contribute substantially to the evolution of appropriate survey questions to identify food insecurity and hunger.

As a closing, I wanted to find something pithy and meaningful to say, as Dr. McGinnis usually does. As I thought about this—as I was shoveling the driveway and playing Nintendo with my snowbound children over the last few days—and as I thought back over the last decade, and as I look around the room today, it seems to me that the convening of this meeting—a cooperative effort of USDA and HHS agencies focused specifically on measurement tools and on identifying research that needs to be done to inform program and policy decisions and bringing together the best people equipped for the task—is in itself a pretty meaningful statement of commitment and opportunity.

So, best wishes for a very productive meeting, and we all look forward to your concrete outcomes. Thanks.

MIKE FISHMAN: Thank you very, very much, Linda. As I listened to your remarks and to Shirley's remarks, I was making X's through some of the things that I would like to share as well, so that I won't repeat what has already been said.

In addition to thanking Shirley and Linda, before I get into the substance of my remarks, I would like to say a few more words of thanks. Our being here today is due to the hard work of many, many folks, both on my staff and at HHS to make this meeting happen. When you're sitting in my job and you're handing out assignments left and right on a day-to-day basis, there are many tasks that people do because they need to do them. But there are some tasks that come along, and people can't wait to do them. Preparing for this conference and helping to chart the course that we're starting on today is something that the people who worked on it, I know, took on with great relish. I would like to acknowledge Steve Carlson and Ted Macaluso, who are staff managers in our Office of Analysis and Evaluation at the Food and Nutrition Service, and their food-security research team—as well as Ronette Briefel, who directs the Nutrition Monitoring and Related Research staff at NCHS—for the hard work that they have all put into this enterprise. In particular, I want to acknowledge our FNS food-security research team—Bruce Klein, Margaret Andrews, Gary Bickel, and Sharron Cristofer. With all the careful organizing and preparation they have done for the conference, I know that it is going to be successful. I also want to acknowledge KRA Corporation, our contractor, for putting the conference together, for the fine work they have done to give us a nice environment to function in. I probably have left out some people, this has been a project of many folks who have been working very hard. I know Jay Hirschman has also been involved. I could probably go around the room and name a lot of other people. That is the nature of this enterprise, that we are going to have to work together to make something happen, and that is already happening and that is very exciting.

What we are doing today is bringing many of you together who are not in the federal government, who are in the private world, to join us in our effort to try to come up with a consensus around the right measures of food security and hunger. That is a challenge. But my staff tells me that this is the right time to do it. They tell me that the work that has been going on by a number of people across the country over the past several years has brought us to the point where we now have a good chance to reach consensus on how to measure hunger and food insecurity. We have some basic definitional agreement that came out of the LSRO report that Linda spoke to, and we have work that has been going on by Kathy Radimer, Cathy Campbell, Christine Olson, and others at Cornell University. We have the work that has been going on with the CCHIP project in many local and State-level surveys under the technical direction of Cheryl Wehler and a large expert advisory board. In both the Cornell and CCHIP work, many highly qualified folks have been working very hard to develop valid and reliable ways to measure hunger and food insecurity. And, we have the work that Linda Meyers spoke to, relating to the food-sufficiency question that USDA has used in all our national food consumption surveys since 1977 and is now included in NHANES III, along with several other questions adapted from the Radimer and CCHIP surveys. This same set of food sufficiency questions also has been used now in the special Extended Measures of Well-Being module in the Census Bureau's SIPP surveys, and a similar set has been used in our recent Food Stamp Cashout Study surveys. So, you can see that we now actually have quite a substantial amount of data and research experience

that begin to provide some very definite ways of looking at the question of measuring hunger and food insecurity in the United States. The time is right for us now to pull that work together and come up with a consensus on how to measure food security and food insecurity and hunger in the United States. If we can do that, we can move ahead to operationalize it.

We have, in fact, reserved space with the Bureau of the Census in the April 1995 Current Population Survey to begin to field the questions that we come up with through this enterprise that you are joining to help us with today. We are seeking your input to help us put together a research agenda and a survey instrument that we can use to collect the national-level data that are needed to begin to do the necessary followup work to get a better handle on hunger and food insecurity in the United States. So, I think we're well positioned to move ahead on this agenda, and this conference is a key milestone for us to do that.

So, with that, I would like to move now to introduce Jean-Pierre Habicht. We're very lucky to have Jean-Pierre with us today. He has had a very distinguished career in this field. Most recently, since 1977, he has been the James Jamison Professor of Nutritional Epidemiology at Cornell University. He chaired the expert committee that oversaw the first scientific-evaluation report on the country's National Nutrition Monitoring System, and he has written and spoken on issues related to nutrition and food security for many years. I have only had the privilege of meeting him today. I think that many of you know him a good deal better.

But to give you an understanding of how much we wanted Jean-Pierre to be with us today and how committed he is to the issue that we're here to talk about, when we first contacted Jean-Pierre's office, we were told that he had another commitment and couldn't be here. But our food security research team was so committed to having Jean-Pierre lead off the conference, if there was any way he could possibly do so, that Gary Bickel actually reached Jean-Pierre in Switzerland, where he was visiting his family on his way home from China. He interrupted an already scheduled day at the National Academy of Sciences to come join us this morning, and we really appreciate that. I very much look forward to Jean-Pierre's comments.

JEAN-PIERRE HABICHT: Thank you, Mike. It is a great pleasure for me to be here, because hunger and malnutrition are major concerns to many of us inside and outside the Government. It is wonderful to see that not only can we work on the issue together, but how much work actually has already been done within the United States Government, within the USDA and the National Center for Health Statistics, on this issue in times when it was actually difficult to do it. I want to thank all of the staff of those agencies for their insight and their savvy in moving this forward. In my opinion, we are about 5 to 10 years ahead of where we would be, if we had to begin now. So, I want to thank all of you very much.

I got various messages as I was wandering around the world that USDA wanted me to talk today, and I said there was no way, because I was in another meeting on the WIC today, and I felt today was the crucial day of that meeting. Yesterday and today are the days when the whole planning gets organized, and my experience is, if one doesn't get one's two bits in then, it is too late later. Here, I already knew that many of you are much better prepared than I am,

both in discipline and in experience, to deal with the issue, and my presence was really superfluous. Well, Gary Bickel laid on the flattery, and I am here.

Actually, I really do want to thank him, though, because in writing this, thinking this through, I was pleased to see how far we have come since just a few years ago.

The first issue is that physiological protein-calorie malnutrition is not a national public health problem in the United States, nor are there other nutrient deficiencies that require worrying about, whether people can eat enough to survive. As I was writing that, I realized that that insight came to me about 15 years ago when I first came to the United States. My previous work had all been in developing countries, where people are starving to death, and that was a discovery for me, being in a country where starving was really not a problem for a large proportion of the population. It doesn't mean that there aren't small groups that have problems, but not for most of the United States' population. At the federal level, starvation is at such a low level in the U.S. that it is hard to mobilize resources effectively to deal with it.

That insight really bothered me, because I saw that as that fact became more and more known—a wider-spread knowledge of this fact would undercut the nutrition programs and a number of welfare programs that were in support of better nutrition and health. I then began to think about it and also to look around, and it became very apparent to me that there were two other issues for the United States, one of which was well recognized, the need to concentrate on improving the quality of the diet to prevent imbalances that result in chronic diseases, and this has been an enterprise that has been attacked now for some years.

The second one, though, was that many Americans go to bed hungry. There are many more who go to bed worrying about where tomorrow's meal, especially their children's meals, are coming from. Those of us here today believe that that state of affairs is preventable in a country as developed and wealthy as the United States. On this issue, little work has been done to date, almost all of it done by those of you who are here at this conference.

The issue is that if hunger is something that is of concern in public policy, which I believe it should be, then we have to make that concern visible. So, the most important step facing all of us is making the issue of hunger and food security more visible. This is the enterprise that faces us today.

I would like to talk about what visibility means from a practical point of view. Objective evidence that a social problem is visible is the fact that money is being spent to address it. Somebody or somebodies must decide to spend those moneys. There seem to be four conditions for deciding on public action (see Exhibit 1).

As is often the case in real life, we find ourselves today at step four, even though the previous steps are mostly still pending. USDA and NCHS are taking the courageous initiative to bring the most powerful instruments available in the United States to bear on step four. Ultimately, these instruments will include the Nationwide Food Consumption Survey and the

Visibility Prerequisites for Hunger and Food Insecurity

- 1) A problem
(consequences)**
- 2) A defineable believable problem
(construct validity, face validity)**
- 3) A remediable problem
(determinants and dynamics)**
- 4) A widespread problem**

National Center for Health Statistics' surveys, including the Health and Nutrition Examination Survey. Initially, I understand that your immediate task is to advise on the data-collection instrument to be used in the United States Current Population Survey at the Bureau of the Census. It is up to the others in this room, and the larger community concerned with social welfare, to deliver the tools so that the USDA can do its task.

We must deliver the measurements. We must also deliver the means to interpret the measurements. This last is impossible unless we also accomplish the previous three steps. So, this conference must bring together our best guesses about what the outcomes of these steps will be. In some cases, we have a pretty good idea. For instance, steps two and three, what is happening. For step one, I think we have some good ideas about the potential consequences without much certainty yet. It is important that we move quickly to investigate these ideas, so that data interpretation includes some statements about the importance of hunger and food insecurity in terms of its consequences.

Let me be very clear. The old shibboleths of the consequences of hunger just won't hold. If we continue to push those, we are going to find that there is a conflict between the scientific community working on this and the political activists, and that will really destroy us all. It is really crucial at this moment that we reexamine those shibboleths as we try to advance forward. There are a number of issues that in the short term we have to be very careful of, not to come into conflict with each other.

The basic and important point is that measurements without the basis to interpret them are often worse than useless. They are counterproductive. For instance, hunger advocates have historically equated hunger with physiological malnutrition. They have used dietary intake of energy and nutrients as their measurement and have used the recommended dietary allowances as their standard to interpret the intake as unsatisfactory.

As the National Academy of Sciences has pointed out, this interpretation results in high proportions of people falsely being identified as malnourished, a proportion in the United States that is almost 100 percent. Very often, 100 percent of those people being identified according to these measurements as malnourished or as having inadequate diets have perfectly adequate diets.

This misinformation then results in paradoxes, such as the finding that many of the poor both ingest insufficient energy and are at the same time obese. The reason for the misinformation is that the meaning of hunger in terms of its consequences is not understood, and the wrong measurements and mistaken interpretations then ensue. These incorrect findings are also not credible and undercut our efforts to make hunger and food insecurity visible.

Thus, it is important to understand the dynamics of hunger. The following is my understanding of hunger and food insecurity from work done in the United States, influenced by my work in areas that are prone to famine. Only now, it is important that these concepts, such as the one I am now going to advance, be very carefully honed and tested. Only by testing them

scientifically will we know whether they are true or not. As I said before, it is crucial first of all from a scientific point of view that they are correct, but much more importantly, it is crucial from an activist intervention point of view that we are correct in this, because if we do not understand this, we will not know how to deal with these issues. And it is not just by throwing money around.

The basis for this understanding is not new. But I know that as more information becomes available, I will be changing my mind. Actually, I have already changed my mind three or four times over the last 2 days as I talked about it with colleagues who are actively working on it. I suspect what I say today will not be true by the time this conference ends tomorrow. But I think the basic overall picture is probably correct.

First, there is a negative finding. To date, it has not been possible to find a physical measurement of hunger such as a serum metabolite that is pertinent to our concerns. I think this is for lack of effort, but I also think that now it is not a priority, given what I think we know. I emphasize that I do not think it is a priority because we have enough insight into hunger and food insecurity without such a measure that we can address the four steps for deciding on public action without such a physical measure.

Furthermore, researching such a measure will be expensive, time-consuming and of uncertain outcome right now. Not only has one not found a physical measure, but the reporting of hunger has not been very useful as a survey tool. Self-reported physical sensation of hunger pangs has been very useful as a research tool and should not be abandoned for this purpose. But alone in surveys, self-reported hunger pangs is not enough.

The major advances need to go beyond the hunger pangs and look at how people deal with the threat of hunger. Thus, step one has been redefined to include not just the physical pangs of hunger, but the food insecurity that threatens this hunger. Here, in the most simplistic terms, there seems to be a process in which one stage precedes the other most of the time. Stage one is that as a family—and I'm going to talk about the mother as the person who has to worry about these issues in the family—deals with the fact that they don't have the resources necessary to feed

themselves and their children, the first thing that happens is the diversity of the diet goes down. They become more and more frugal. In fact, one of the findings from the first monitoring report that was sent to Congress about 7 years ago was how efficient the poor really are in acquiring foods—they get the highest calories per dollar. The poorer they are, the higher the calorie per dollar is. Not only the higher calorie per dollar, but in getting many other nutrients, per dollar, they are very, very efficient. The big problem is that as they get more and more efficient, the calories begin to outweigh everything else, and they spend their money on more and more calorie-rich foods, and the diet becomes more and more monotonous.

Secondly, as resources get tighter still, their stocks of food in the house go down. They don't have enough money to be able to keep their stocks up in the house. Thirdly, the caretaker or the mother usually starts sacrificing herself before she starts sacrificing the rest of the family, especially the children, and she begins consuming less food. To the degree that—it is our

impression, although we haven't yet been able to investigate this adequately—that they are actually losing weight during this period. Finally, the children themselves eat less and go to bed hungry.

The number of families in each of these stages decreases as one moves to more severe food-insecurity problems. This last is crucial in interpreting the findings from surveys that deal with hunger and food insecurity. The reason I say it is important to realize that this occurs in these stages is that it is very similar to what happens in iron-deficiency anemia. First of all, the diet quality for iron intake or absorption goes down. Secondly, the iron stores go down. Thirdly, one begins to see evidence that the cells are not getting enough iron, and it is only fourthly that one begins to see iron deficiency itself.

The reason for making that analogy is that we must avoid the mistakes, made in measuring iron deficiency in the United States in the past; I'm talking about 20 years ago. At that period, when we were adding together all of these indicators as one overall scale, that was disastrous. The reason is that the number of people who are going toward a more monotonous diet is much, much greater than the numbers of families in which the children are not getting enough to eat. If one doesn't analyze these data according to the staging, one will come up with crazy results, and that is what happened with iron-deficiency anemia. So, I hope we will avoid that mistake in this area.

Now, we come to the crucial issue for decision makers, including administrators, politicians, and the general public. This is a combination of credibility on the one hand and of how widespread the issue is on the other. For instance, we know that perceived home diet quality is constrained by finances for many homemakers. It seems likely to me from some data that I have seen that, in some communities, the majority of mothers feel this way. Do these numbers really represent people whom society should be concerned about?

We discussed earlier how there is as yet little evidence of how hunger in the United States is a determinant of physiological malnutrition. Even the direct link to the unpleasant sensation of hunger is not going to be apparent from the measurements that we have. Thus, we need further arguments to substantiate our concern not only with hunger, but also with food insecurity. Previous work in bringing nutritional issues to bear on larger public-policy decisions may be helpful in deciding on our priorities in making hunger more visible. When I talk about previous work, I mean not only in the United States, but also internationally and in specific countries.

The first is, what are the consequences in terms that are socially and economically meaningful? That is step one. These may include undesirable social behavioral problems such as holding a job, which may be difficult under the stress of trying to figure out how one is going to feed the family, of not being able to concentrate in school because of lack of energy, or of acquiring eating habits such as gorging and consuming high-energy fatty foods because they are cheaper. But this habit leads to chronic diseases, and it may be the link that would explain why the poor are obese, why they have these unhealthy diets.

Those consequences at the present moment are absolutely pure conjecture, but it is crucial that we examine these conjectures as quickly as possible and understand other important consequences, so that we can make clear what step number one really is all about.

The next issue is, what can be done about it, which is step three. For instance, if all we as nutritionists can say is that our measures of food insecurity are a good index of poverty, but not better than other indicators, the implications are not very different and do not have much more impact than just saying people are poor. Very often at this juncture in our research, in meetings, people will get up and say, we know what the problem is. All you need is to be sure that people aren't poor.

Unfortunately, the methods that we have at hand to deal with that are very expensive, and they are not right now politically feasible.

Thus, one would hope that one could improve nutrition coping strategies to reduce food insecurity inexpensively for the majority, only requiring expensive interventions for the minority. For instance, the coping strategies to a perceived threat of hunger are triggered by a mother's perception of the necessary quality and quantity to feed her family. An exaggerated perception of necessary quality increases the mother's insecurity, because a physiologically adequate quality might be achievable, but the mother's perception of adequate quality is not.

Now, this says that some nutrition education will reduce food insecurity, because that insecurity represents a response to a threat that doesn't exist for that family. I don't want to leave you with the idea that I believe that that is the major concern. I think that there are real specific barriers to a family's being able to acquire the food that they need. But I think that some of these barriers are more cheaply dealt with than others, and we must investigate these barriers and understand them.

Thus, we must understand the determinants to prevent or mitigate food insecurity and hunger. I hope that this meeting will begin to address itself to that issue, because even though it is not necessarily an important measurement issue right now, it is going to become an important issue in the future. So, thought about this is important.

As one moves forward, it is important to differentiate between determinants and symptoms that are not causal. The reason I draw this to your attention is, I have seen many times where a symptom triggers action against the symptom and doesn't deal with the causes at all. Remedying noncausal symptoms will not deal with the underlying problem. For instance, a mother decreases quality in the face of a threat of insufficient quantity. In such a case, the threat is the quantity. She understands the quantity, she is decreasing the quality. In such a case, handing out vitamin pills to improve the quality is not the solution to the problem. I would just like to be sure that that is clear, because I'm afraid people are going to start concentrating on improving quality of the diet in this situation, when that is not the issue; that is simply a symptom of a threat that is more serious and requires another kind of intervention.

The final issue that relates to steps one and three is how does this knowledge fit into a social welfare system that is concerned with the larger physical and social well-being of the whole United States' population? Good nutrition and food security are prerequisites, but they should not be the only focus of our concerns for those who are food insecure. Evidence that one can avoid expensive nutrition interventions is not evidence that other expensive complementary interventions are not necessary for the same people. The danger I see is that, in our research we find cheap interventions to deal with hunger and say fine, we have dealt with that group. In fact, that group has other major problems that we're not dealing with, and I am very worried about this atomization of the way we approach these social problems.

Coordinated interventions addressing jobs, housing, education, physical security, nutrition, and health are all necessary. In fact, the tragedy is that the United States is remarkable among developed countries in the disorder with which social problems are addressed. It is worse than poor coordination; different interests actively sabotage each other for increased funds for their own lobbies and bureaucracies. The result is a good deal less effective than even an uncoordinated whole would be.

Thus, it is crucial as we go through this, as we address hunger and food security, that we do not fall into this confrontational trap, especially as we seek effective interventions. This means that as we study the determinants and consequences of food security, we must understand its larger social and economic context, and this does have implications for the kinds of measurements that will be required to understand the larger whole in which hunger plays its role.

Again, thank you very, very much for inviting me, and I really enjoyed thinking about this.

MIKE FISHMAN: Thank you very much, Jean-Pierre. I think we're off to a fantastic start. I think that you have laid the challenge out for us, and it sounds to be a difficult one, but hopefully one that we can rise to.

What I would like to do now is to thank Jean-Pierre and Shirley and Linda for being with us this morning, and then to ask Sharron Cristofar, who is going to chair the first panel on current issues, to come forward along with Christine Olson and Cheryl Wehler and Steve Carlson and Ronette Briefel. It looks as though the program doesn't provide for a break here, so we're just going to segue into this first panel, to talk about current issues related to measuring food security.

Current Issues—Session I: Measurement

Chairperson: Sharron Cristofar

Use of Radimer (Cornell) Hunger Measures in a General Population Survey

Christine Olson

The Use and Refinement of CCHIP Survey Items for a General Population Survey

Cheryl Wehler

The USDA and NHANES Food Sufficiency Question as an Indicator of Hunger and Food Insecurity

Steven Carlson

Ronette Briefel

SHARRON CRISTOFAR: Good morning. It is really an honor for me to be here this morning, chairing this panel, both personally and professionally. What the panel is going to talk about this morning is in a field that I have been working in with Peter Basiotis for 7 years, so today represents a culmination of a dream that started about 7 years ago, Peter and I never thinking that we would ever get to this point. So it really is a pleasure.

This panel represents basically four surveys that deal with measurement of hunger and food insecurity. I will introduce each separately. What I would like to do is to hold questions until the end, and then I will take questions from the floor. We will have plenty of time for that.

Our first speaker this morning is Christine Olson. Christine is going to talk to us today about the Cornell hunger scale, which was developed through an innovative methodology, using qualitative research techniques to generate the food-security indicators and actual survey questions.

Let me tell you a little bit about Dr. Olson. She is a professor in the Division of Nutritional Sciences as well as Assistant Dean for Research in graduate studies in the College of Human Ecology at Cornell University. Prior to 1991, she was an assistant professor and associate professor for courses in maternal nutrition at Cornell University. She has been a visiting associate professor for the School of Public Health at the University of Minnesota. In addition to receiving several awards, she is coauthor of many articles such as "Understanding Hunger and Developing Indicators to Assess it in Women and Children" that appeared in the *Journal of Nutrition Education*, and an article which is currently in press promoting positive nutritional practices during pregnancy and lactation.

So, without further ado, I'll let Dr. Olson speak to you.

CHRISTINE OLSON: I am very pleased to be here. I would like to compliment the organizers of this conference and lend my support to what I hope will be a very productive meeting with highly successful outcomes.

As a second part of my introduction, I want to say that the research I am presenting today began with a doctoral dissertation of one of my students, Kathy Radimer. Hence the name, Radimer-Cornell indicators. Kathy would probably be here, but Kathy is now a research associate in the Department of Social and Preventive Medicine at the University of Queensland Medical School in Australia.

In addition, the work that I'm going to talk about has benefitted greatly from the intellectual input and critique from members of Kathy's doctoral dissertation committee, Dr. Jennifer Greene, Dr. Cathy Campbell, Jean-Pierre Habicht, and then more recently, others have become involved in this work, Dr. Anne Kendall, Edward Frongillo, Jr., and another doctoral candidate, Ann Kepple. The original work that we did was funded by the New York State Department of Health. Dr. Radimer was supported by a National Science Foundation fellowship. Some of the recent work that I am going to talk about for the first time today was financially

supported by the New York State Department of Health and the Cooperative State Research Service of USDA.

So, with those preliminaries out of the way, most of you in the audience have probably seen our two publications in the *Journal of Nutrition* and the *Journal of Nutrition Education*. So, for my remarks today, I just want to highlight some of the key points of this published work as well as bring in some of the new findings that we have from a second survey that we have done, which is a stratified random sample survey of women from a population in a county of New York State.

Now, whether it represents Jean-Pierre Habicht's influence on me or was something I have always had in my head, I am a firm believer that if you want to go out and measure something, the first thing you have to do is to understand very thoroughly what this phenomenon is that you want to investigate. It was that belief that led us to start this work with a series of in-depth interviews of women about their experiences being hungry or having food problems, and how they coped with the situation, and how it was different from when they weren't having food problems. It was very clear from that initial work that these women whom we interviewed held two conceptualizations of hunger, one of which was quite narrow. This narrow concept of hunger almost universally referred to insufficient food intake and going without food.

Women made statements like, "hunger is when I cannot get enough to eat," or "there is nothing at all to eat." Another woman said, "to be hungry is to go at least 3 or 4 days without food, without anything." These women's narrow definition of hunger emphasized the physical sensation of hunger. One couple said to us, "being hungry is when you can't sleep because your stomach hurts." I think most of us in this room would label what these women were calling hunger, true hunger. There would be little debate about that narrow concept of hunger.

However, these women also had a broader concept of hunger. I think the quote from our article in the *Journal of Nutrition Education* probably best illustrates the difference that these women had between the narrow and the broader conceptualization of hunger. One woman said, "going hungry hungry is when there is absolutely nothing in the house." This is the narrow concept of hunger. But then this woman went on and also talked about this broader concept of hunger: "but going hungry is when you have to eat the same thing all week long, and you have no variation from it, and you know sooner or later you're going to run out of that, too, because it is only going to go so far. So each day you cut down the portions a little bit smaller and a little bit smaller, and you have a tendency to send your kid off to play with somebody else, so that they are there at mealtime, so that they do eat."

You can see that this broader concept of hunger includes quality of diets, particularly the monotony, eating the same thing day after day. It refers to household food supply; it's going to run out. It refers to feelings; you see that "worry" comes through in those words. And it speaks to what the woman does to try to maintain her household food supply. I think that this broader conceptualization of hunger that we heard is consistent with some of the definitions that have been put forth for food insecurity (see Exhibit 1).

Exhibit 1

Components and Levels of Food Insecurity.

Component	Levels	
	Household	Individual
Quantitative	food depletion	insufficient intake
Qualitative	unsuitable food	nutritional inadequacy
Psychological	food anxiety	lack of choice and feelings of deprivation
Social	food acquisition in socially unacceptable ways	disrupted eating patterns

A second finding of this original work is what I hope is a familiar table now to many of you, our classic two-by-four table (see Exhibit 2). It was clear in talking to these women that food insecurity was experienced differently at the different levels of social organization that were relevant, the household level and the individual level. At each of these levels of social organization, food insecurity consisted of four components.

At the household level, the most prominent aspects of the interviewee's descriptions of their experiences were the anxiety about their food supply, the psychological component, and the quantitative component, the concern about depletion of that food supply. An important consideration in their minds in whether food depletion had occurred or not, was whether the food that was gone or becoming depleted had been acquired in socially acceptable ways. So, there may have been some food in the house, but if that food had been acquired in socially unacceptable ways, they considered their household food supply depleted.

At the individual level, food insecurity also has qualitative, quantitative, and social components, and whether these aspects were considered food insecurity depended on whether they resulted from lack of choice and feelings of deprivation, the psychological component.

The third major finding of that original work was, to quote Kathy Radimer, the idea that hunger is a managed process. At the population level, there appears to be a sequence to it. Some of our original thinking has been altered slightly.

Exhibit 3 shows our modified thinking of the key concepts and the progression of these concepts as a household experiences food insecurity. Generally speaking, when a household's usual means of food acquisition becomes inadequate, the food anxiety component of household food insecurity is experienced. I would say this is not needless worry. In all our work, anxiety is strongly correlated with household food depletion. People are worried for good reason. There is not food in their house.

This initiates the use of a variety of coping tactics. You can see some of them listed. These coping tactics do not result in a household averting food insecurity, but which coping tactics are used and how they are used does determine which components and who in the household experiences food insecurity.

In this progression of food insecurity, in our recent work, we found that the quality of women's and children's diets was affected next. Finally and last, it is the quantity of the child's food intake that is affected, and when this becomes severe enough, you're in a situation of hunger.

Exhibit 2

Radimer-Cornell Food Insecurity Indicators

Household Level

Food Anxiety Component

I worry whether my food will run out before I get money to buy more.

I worry about where the next day's food is going to come from.

Quantitative Component

The food that I bought just didn't last, and I didn't have money to get more.

I ran out of the foods that I needed to put together a meal and I didn't have money to get more food.

Qualitative Component*

I can't afford to buy the foods I think I should to feed my household

We eat the same thing for several days in a row because we only have a few different kinds of food on hand and don't have money to buy more.

Woman Level

Qualitative Component

I can't afford to eat the way I should.

I can't afford to eat properly.

Quantitative Component

I am often hungry, but I don't eat because I can't afford enough food?

I eat less than I think I should because I don't have enough money for food?

Child Level

Qualitative Component

I cannot give my child(ren) a balanced meal because I can't afford that.

I cannot afford to feed my child(ren) the way I think I should.

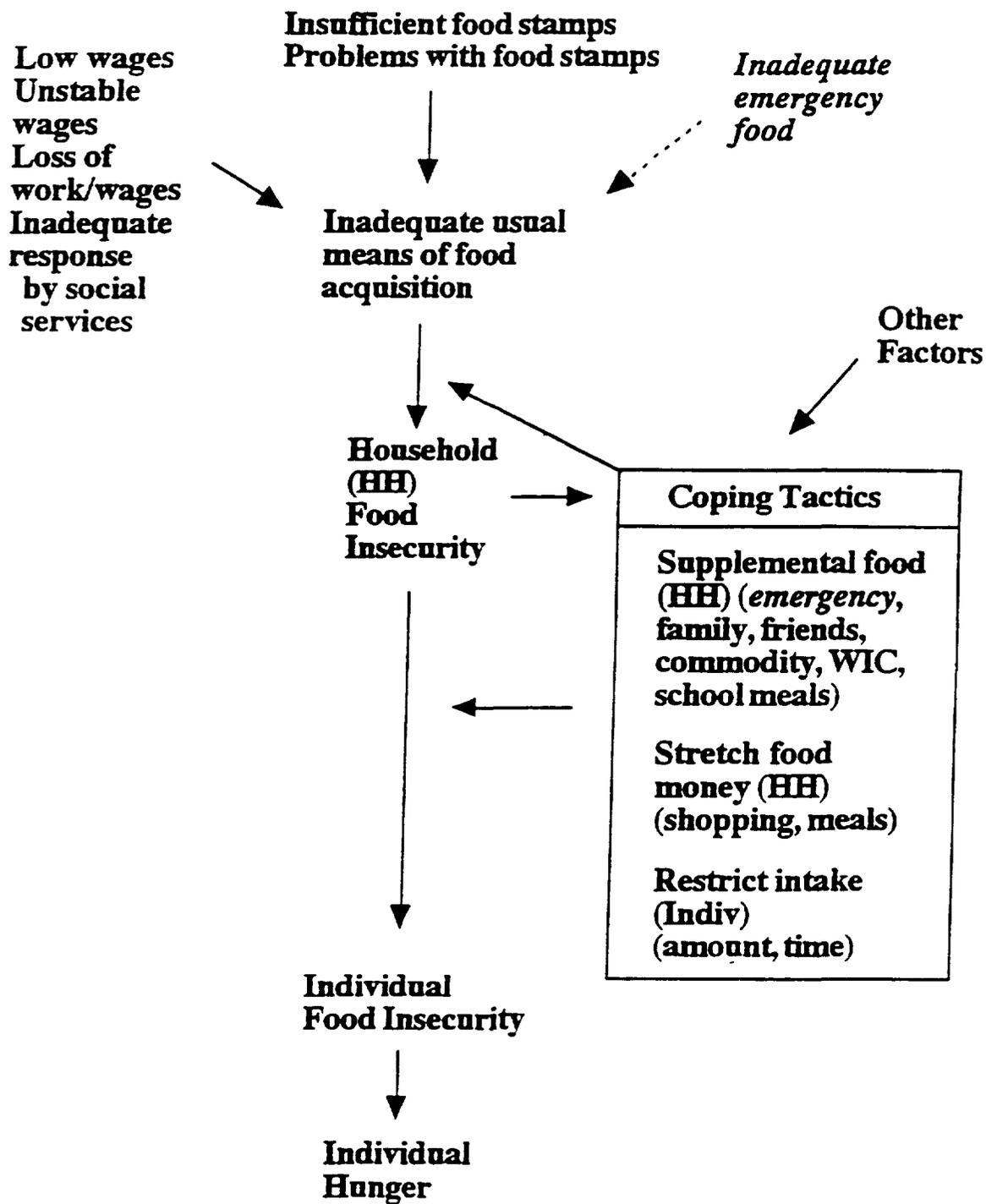
Quantitative Component

My child(ren) is/are not eating enough because I just can't afford enough food.

I know my child(ren) is/are hungry sometimes, but I just can't afford more food.

*Not included in the original set of indicators. It is recommended that items to measure this component of household food insecurity be added to the original set of indicators.

FOOD INSECURITY: CONCEPTS AND PROGRESSION



level of food insecurity as problematic. The level of the problem that constituted food insecurity was based on the description of things that the participants did or what they considered to be wrong or abnormal. The indicators for all the components and levels were designed to assess this degree of severity of food insecurity. If there was a desire to assess a more severe level of food insecurity, for example, our participants' narrow definition of hunger, consideration would have to be given to the possibility of adding several indicators to the existing set. Our perception is that the level of food insecurity that we studied with our indicators is problematic by most American standards. In our research, the households in which the quantity of food intake was decreased among children or was perceived as insufficient, those were the households that were experiencing the most severe level of food insecurity.

So, in closing, I want to say first, from our experience, it is possible to develop direct measures of so-called subjective phenomena such as food insecurity and hunger. It comes from in-depth understanding of the experience itself. Second, for interpretability and hopefully for sensible public policy, it is important to have a conceptual framework for the phenomenon itself as well as its progression and related factors.

We have made an attempt to do this, and we would welcome your input. I would like to say thank you for inviting me here today.

SHARRON CRISTOFAR: Thank you very much, Christine. Our second presentation will be made by Cheryl Wehler. She is going to talk about the CCHIP surveys that have examined hunger at the State and community level in 24 different sites, so they are a little bit different than the Cornell approach. This system of surveys was first developed and has been going on continuously since 1985.

Ms. Wehler had completed all but the dissertation for her doctorate in international nutrition under Neville Scrimshaw at MIT when she was hired in 1982 to direct the Massachusetts Nutrition Survey, where she first began to apply her approach to identifying food insecurity and hunger through social survey methods. In 1983, Cheryl became Director of Nutrition Research for the Massachusetts Department of Public Health, and, in 1985, she initiated the Community Childhood Hunger Identification Project, known as CCHIP, under the auspices of the Connecticut Association for Human Services. The initial development and validity testing of the CCHIP hunger measure was carried out there, culminating in its major pretest as the New Haven Risk Factor study.

Beginning in 1987, the CCHIP project went nationwide under Cheryl's direction, aided by a large and distinguished board of academic experts in the field. Major foundation funding support was obtained from Ford, Pillsbury, Sarah Lee, Kraft Foods, and others, while the Food Research and Action Center provided sponsorship for the national project. To date, 15 CCHIP surveys under Cheryl's supervision have been completed, and 6 more surveys currently are underway, nearing completion.

CHERYL WEHLER: Thank you, Sharron. I'd like to thank you for inviting us to join you in this important endeavor. My close working colleagues on the CCHIP project, Dr. Richard Scott and Dr. Jennifer Anderson, are here with me today.

Hunger is a complex, multifaceted social problem lying somewhere on the continuum between inadequate resources to acquire sufficient food and resultant negative outcomes such as clinical malnutrition, illness, or developmental delays. Although the social and political value of measuring the extent of hunger is undeniable, the theoretical models of relevant indicators and the construction of valid and reliable measures have been difficult.

Hunger historically has been theoretically defined in terms of its medical consequences, thereby rendering it more easily measurable using clinical, anthropometric, and biochemical indicators of nutritional deprivation. Unfortunately, using clinical undernutrition as a proxy for hunger impedes our ability to ascertain risk factors that may more directly contribute to chronic hunger than to any physical manifestation of this problem. This is especially true in industrialized countries, where food deprivation, like poverty, is relative versus absolute.

The Community Childhood Hunger Identification Project, or CCHIP, is an effort to employ a conceptual model of the continuum of the hunger problem to develop a broad theoretical definition of hunger and to operationally define and measure hunger within the social and economic context of the United States. This research project was a pioneering effort to systematically define and develop a measure of hunger as a socioeconomic construct and to utilize social science methodology rather than clinical methods. From their inception, the CCHIP hunger index and methodology were developed for use in a targeted population, that is, in United States low-income families with children.

I want to explain how we got to the CCHIP hunger index (see Exhibit 1). First, we began by developing a conceptual definition of hunger. Then, an operational definition of hunger and a method for measuring hunger were determined, with those being developed concurrently. The measurable components of hunger were determined; precursors and responses to the indicators of hunger were also determined. Then, all other current measures of hunger and the results of studies using those measures were reviewed. This was in 1985, so we have to remember where we were at that point in the science of measuring hunger.

Separate focus groups were conducted with representatives of low-income families, service providers, and researchers. Questionnaire items to indicate hunger were drafted, based on both the literature review and the focus-group results. The conceptual framework of the Massachusetts Nutrition Survey, which assessed nutritional status, was modified to include explicitly the concept of hunger. The questionnaire items to elicit precursors, responses, and other sociodemographic factors associated with hunger were drafted. This draft questionnaire was reviewed by a large panel of distinguished academic and clinical experts in the field and was revised. This process of expert review and revision was carried out four more times.

Exhibit I

DEVELOPMENT OF THE CCHIP HUNGER INDEX

- i. The conceptual definition of hunger was developed.
- ii. An operational definition of hunger was developed.
- iii. A method of measuring hunger (survey research) was determined.
- iv. The measurable components of hunger were determined.
- v. Precursors and responses to the indicators of hunger were determined.
- vi. Then all current measures of hunger and the results of studies using these measures were reviewed.
- vii. Separate focus groups were conducted with representatives of low-income families, service providers, and researchers.
- viii. Questionnaire items to indicate hunger were drafted based on this review and focus group results.
- ix. The conceptual framework of the Massachusetts Nutrition Survey (which assessed nutritional status) was modified to explicitly include the concept of hunger.
- x. The questionnaire items to elicit precursors, responses and other sociodemographic factors associated with hunger were drafted.
- xi. The questionnaire draft was reviewed.
- xii. Revisions were made based on the comments from the reviewers.
- xiii. Revisions were again reviewed.

(xi, xii, and xiii were repeated five times)

In 1985, an early draft questionnaire was pretested with 39 families to evaluate whether the questionnaire items were understood by the respondents as intended by the researchers; revisions were made based on that pretest (see Exhibit 2). A second pretest was conducted with 30 families to test question comprehension, sequencing, and nonverbal communication between the respondent and the interviewer. Again, revisions were made based on the pretest results.

In 1985 and 1986, the questionnaire was used in a pilot study of 403 low-income families with children in New Haven, Connecticut. Revisions were made in the questionnaire and methodology based on the results of the pilot study. In 1987 and 1988, a demonstration project was conducted in 3 sites in Washington State, with a sample size of 789 in the 3 sites overall, to assess the effects of necessary implementation adjustments in urban and rural surveys, as well as in special populations such as migrant farm workers. Revisions were again made to the questionnaire and methodology.

From 1989 to 1991, we tested the reliability of the measure and the survey methodology by conducting 7 surveys with a combined sample of 2,335 households in various sites across the country. Again, we made revisions based on these study results, on interviewer debriefings, and on respondent debriefings. Now, using this refined questionnaire and methodology, we are near completion of 11 surveys covering an additional 5,282 households in 10 states.

The current CCHIP questionnaire contains 165 questions. Besides the data items for the CCHIP hunger index itself, our questionnaire elicits information on household demographics, income and expenditures, strategies used by households to alleviate food shortages, participation and barriers to participation in public food programs, access to health care and medical insurance coverage, illness, school attendance, and risk of homelessness. The questionnaire also contains a food-frequency category.

I am going to report on information today from the five most recent CCHIP surveys (see Exhibit 3). We have completed a statewide-study in the State of Maine, a single-county study in Rensselaer County in upstate New York, a survey of 11 central counties in Indiana, and statewide surveys in both South Carolina and Utah.

In general, we use a two-stage area probability-sample design and apply standard cluster-sampling techniques. Our sampling approach and general sample design were developed in consultation with Westat Corporation and independent sample-design experts. Our primary sampling units are U.S. Bureau of the Census block groups. We build a sampling frame of eligible households by door-to-door enumeration of every block group that is chosen to represent a domain, and then we randomly select households into our sample. Then, we conduct in-home interviews that take about 1 to 1½ hours. The response rate in these most recent five CCHIP surveys ranges from 65 to 89 percent. Our interviewers primarily are women hired from the target populations in each site. Typically, they received 35 hours of training.

Exhibit 2

TESTING OF THE CCHIP HUNGER INDEX

- i. A draft questionnaire was pretested with 39 families to evaluate whether the questionnaire items were understood by the respondent as intended by the researchers. (1985)
- ii. Revisions were made in the questionnaire based on the results of pretest #1.
- iii. A second pretest was conducted with 30 families to test question comprehension, sequencing, and non-verbal communication between respondent and interviewer.
- iv. Revisions were made in the questionnaire based on the results of pretest #2.
- v. The questionnaire was used in a pilot study of 403 low-income families with children (New Haven Risk Factor Study). (1985-86)
- vi. Revisions were made in the questionnaire and methodology based on the New Haven Risk Factor Study.
- vii. A demonstration project was conducted in 3 sites in Washington state (n = 789) to assess the effects of necessary implementation adjustments in urban and rural surveys as well as in special populations (ex. migrant farm workers). (1987-88)
- viii. Revisions were made in the questionnaire and methodology based on the demonstration project.
- ix. To test the reliability of the measure and the survey methodology, seven surveys (n = 2335) were conducted in various sites across the country. (1989-91)
- x. Revisions were made in the questionnaire and methodology based on the 7 surveys.

Exhibit 3

PARAMETER TABLE FOR FIVE SURVEY SITES

MAINE	NEW YORK	INDIANA	SOUTH CAROLINA	UTAH
Site:				
State	Rensselaer	11 central counties	State	State
Region:				
New England	Mid-atlantic	E N Central	South Atlantic	Mountain
Dates of Survey:				
9/92-12/92	1/93-7/93	9/92-1/93	7/92-4/93	5/92-10/92
Target Population (N):				
38,255	2,259	28,309	105,859	64,469
Sampling Fraction:				
1.0 %	15.0 %	1.4 %	0.4 %	1.0 %
Number of Households Enumerated:				
21,069	12,205	19,990	23,478	17,280
Completion Rate among eligibles:				
76 %	73 %	65 %	69 %	89 %
Refusal Rate among contacts:				
6 %	11 %	12 %	6 %	3 %
Sample Design: 2-stage probability			PSU: block groups	

In this particular sample of 2,204 households, the average household size was approximately 4 members with 2.5 children; 29.9 percent of the households were headed by females; 59 percent of the families had 2 parents present; 16 percent of the households were black and 73 percent were white; and 37 percent had incomes below 75 percent of poverty (see Exhibit 4). Almost three-fourths of this sample, 72 percent of the families, had wage income and 59 percent had at least 1 full-time wage-earner. Overall, about 50 percent were from urban areas and 50 percent were from rural areas.

When we began this work in 1985, the dominant paradigm of hunger measurement was based on international research, which heavily relied on the medical model. The original theoretical definition of hunger that we constructed reveals that origin: the mental and physical condition that comes from not eating enough food because of insufficient economic, family, or community resources. Even though we saw the value of partially rooting our theoretical definition of hunger in the dominant paradigm of the day—that is, in the medical model—we set as our goal the broadening of the conceptualization of hunger to one that is much more appropriate to the socioeconomic context of the United States. Thus, we chose to employ social-scientific research methods and to develop an appropriate operational definition of hunger: at the household level, insufficient food or food stores and resources for food, and at the individual level, insufficient food intake because of constrained resources.

As you can see in this graphic, we conceptualized hunger as a separate component of food insecurity, but do not view them as synonymous (see Exhibit 5). Because the goal of CCHIP was to measure the prevalence of hunger in low-income households with children, we chose not to measure the other elements of food insecurity not included in our operational definition. We included items on that broader concept of food insecurity in the questionnaire, but made a conscious decision not to measure food insecurity, only to measure hunger.

To develop the questionnaire items to measure hunger, we had to clarify precisely what we meant and when sufficient conditions had been met to classify a household as having a hunger problem. We depicted our measurement typology as a two-by-two table, in which the columns represented adequate and inadequate food and the rows represented inadequate food money.

When both conditions are met—that is, when the household reports both inadequate food and inadequate food money—a hunger problem existed. When only one condition existed, we were inclined to define it as an at-risk situation or a situation that may be too broad to be amenable to public policy, because when you have inadequate food but adequate food money, it could be an issue of choice, mismanagement, or misinformation. If you have a situation in which you have inadequate food money but adequate food, perhaps you're getting extra household support and are being successful in coping strategies, so you're not actually experiencing hunger at the time.

Exhibit 4

CHARACTERISTICS OF SAMPLE

Number of households = 2204

Sociodemographics

The average household had 4.4 members with 2.5 children.

29.9 percent of the households were headed by females.

59.0 percent of the families had two parents present.

11.1 percent of these families were either multigenerational, had a single male head, had other adults besides parents present or had more than one family present.

16.3 percent of the households were Black.

72.8 percent of the households were White.

1.9 percent of the households were Hispanic.

9.0 percent of the households were of another descent.

Economic

37.2 percent of the households had incomes below 75 percent of poverty.

29.5 percent of the households had incomes between 75 and 124 percent of poverty.

33.3 percent of the households had incomes between 125 and 185 percent of poverty.

Almost three fourths (71.6%) of the families in the sample had wage income and 59.0 percent had at least one full-time employee.

Another way of conceptualizing hunger also assisted our thinking (see Exhibit 5). We separated the precursors of hunger from the direct indicators of hunger and from the household's responses to this situation. Later this morning, my colleague, Rick Scott, will describe indicators for many of the ways that households respond to inadequate food and food money. He will detail the differences between intrahousehold and extrahousehold coping strategies.

Under precursors of hunger, for example, we have anxiety about running out of food. We know that once a household is experiencing hunger, the members of the household are going to be anxious, so I don't think we can regard anxiety as only a precursor. Then we can separate the potential hunger precursor indicators into perceptions and behaviors, as well as the wider coping responses. So, under hunger perception, for example, is the perception that you have food shortages or insufficient money for food. As one of the observed behaviors at the household level, you rely on a limited number of foods, so you constrict your dietary variety. You've run out of money for meals, you're buying less expensive meals; and you juggle the bills. We also distinguished the perceptions and behaviors that apply to the adults and to the children.

We worked from this conceptual model of adequacy of both food and food resources to help guide us in developing the questionnaire items (see Exhibit 6). But we drew from each stage of our development process to come up with the actual questions for our questionnaire.

We put the multiple questionnaire items that we had developed from conceptual considerations together with those that we gleaned and tested from our focus groups, our literature review, and our pretests, into the questionnaire for our pilot study for empirical testing. At that point, we were proposing a scaled index and using a wide range of candidate items needed to construct such a scale. Conceptually, we liked the idea of developing a scale to measure hunger, because a scale can capture the multi-dimensional aspects of hunger. We also thought that a scale would add specificity to the measure.

The hunger index that we developed is an additive scale that includes two household items, two adult items, and four children's items. Again, let me remind you that our goal was to measure hunger in families with children. These indicator items include both perceptions and behaviors concerning hunger that occur in a household and that pertain both to the household and the individual level.

These items are placed in the context of resource-constrained food shortages or constrained food intake. So, we believe that this scaled measure of hunger exhibits face validity (see Exhibit 7).

Exhibit 5

HOUSEHOLD INDICATORS

	PRECURSORS	HUNGER PERCEPTIONS	HUNGER BEHAVIORS	RESPONSES
HOUSEHOLD		Food shortages	Rely on limited food	Borrow money
				Borrow food
		Insufficient food money	Run out of money for meals	Meals from friends/relatives
				Food from food pantries
			Buy and serve less expensive food	Meals from soup kitchens
			Juggle bills	Obtain discarded food
				Other (hunt, fish, garden)
ADULTS	Anxiety	Inadequate intake	Cut or skip meals;	
			R not eat for whole day	
CHILDREN		Self-reported hunger	Cut or skip meals	
		Inadequate intake	Go to bed hungry	
			Not eat for whole day	
ELDERS				

Exhibit 6

		FOOD	
		ADEQUATE	INADEQUATE
FOOD MONEY	ADEQUATE	<p>No problems with food because of insufficient resources</p> <p>Therefore "no" responses to questions determining inadequacy of food money</p>	<p>Perception:</p> <ul style="list-style-type: none"> •Not enough to eat <p>Behavior:</p> <ul style="list-style-type: none"> •Rely on limited number of foods •Cut or skip meals •Not eat for whole day
	INADEQUATE	<p>Perception:</p> <ul style="list-style-type: none"> •Not enough money for food <p>Behavior:</p> <ul style="list-style-type: none"> •Buy and serve less expensive foods •Juggle bills to buy food 	<p>Perception:</p> <ul style="list-style-type: none"> •Not enough to eat •Not enough money for food •Eat less than they think they should <p>Behavior:</p> <ul style="list-style-type: none"> •Rely on limited number of foods •Run out of money for meals •Buy and serve less expensive foods •Juggle bills to buy food •Cut or skip meals •Not eat for a whole day

Exhibit 7

**FACTOR ANALYSIS OF CCHIP HUNGER
QUESTIONS (N=2204 OBSERVATIONS)**

Initial Factor Method: Principal Components
Two factors were retained. Third and subsequent
eigenvalues were 0.66 and lower.

Factor Pattern

	<u>FACTOR1</u>	<u>FACTOR2</u>
H1	0.59124	0.46346
H2	0.65180	0.39528
A1	0.77719	0.38615
A2	0.76639	0.37480
C1	0.79311	-0.37780
C2	0.76874	-0.38320
C3	0.75494	-0.35723
C4	0.53890	-0.47339

Variance explained by each factor

	<u>FACTOR1</u>	<u>FACTOR2</u>
	4.046115	1.301915

Varimax rotated pattern

	<u>FACTOR1</u>	<u>FACTOR2</u>
H1	0.09246	0.74553
H2	0.18348	0.73988
A1	0.27883	0.82182
A2	0.27917	0.80616
C1	0.82879	0.29133
C2	0.81531	0.27032
C3	0.78721	0.27901
C4	0.71592	0.04430

Variance explained by each factor

	<u>FACTOR1</u>	<u>FACTOR2</u>
	2.681764	2.666267

The CCHIP hunger measure also exhibits content validity, illustrated by the principal components factor analysis. Factor loadings consistently range from greater than .5 to .8. The Eigenvalue, an indicator of the strength of the factors, with any value greater than 1 considered significant, is approximately 4. The percent of variance explained is approximately 50. Using Varimax rotation, a technique to achieve greater sensitivity in the scaled measure, a second factor emerges that loads the adult factors and the children's factors separately.

Internal consistency of the proposed scale was assessed using coefficient alpha, which was equal to .85, an acceptably high level (see Exhibit 8). The CCHIP hunger index also exhibits strong Guttman properties, which one would expect from an ordered scale. Because our primary goal was to identify childhood hunger, we chose a cut point that would accomplish this. A household could have a score from 0 to 8 on the CCHIP hunger index, but a household was characterized as having a hunger problem only if it had a score of 5 or above because, by definition, then at least one of the children's questions would have to be answered positively, indicating that the problem was extensive enough to be directly affecting the children.

We tested the construct validity of the CCHIP hunger measure to determine whether it cohered in expected ways with variables in our theoretical model of domestic hunger (see Exhibit 9). As is evident, hungry households have incomes at a significantly lower level of poverty than nonhungry households. They spend a significantly higher percentage of their income on shelter. They have a significantly higher number of bills in arrears. They use a significantly greater number of emergency food programs and extra household strategies to handle their resource-constrained food shortages. In addition, children from hungry households exhibited a significantly greater number of illnesses in the 6 months prior to the survey than children from low-income, nonhungry households.

One test of reliability of the CCHIP hunger index is evidenced by the high and consistent alpha coefficients in each site (see Exhibit 10).

The CCHIP hunger scale exhibits dimensional severity (see Exhibits 11 and 12). The X axis is the number of questions on the CCHIP hunger index answered positively and the Y axis is the percentage of responses to individual items in the scale. Therefore, intervals between the lines represent questions that are most likely to make up the score. So, if you look at a score of 1, in general, three-fourths of the households with a score of 1 have said they rely on a limited number of emergency foods to feed the family because of constrained food money, whereas one-fifth have said that they have run out of money to buy food for meals. A few report that adults have changed their eating behaviors because of shortages, but none of the households that have a hunger score of 1 answered positively to any of the children's questions.

We don't see a large number of the children's questions answered positively until we get to a score of 5. This corroborates what we heard in our early focus groups, that adults in households experiencing food shortages due to constrained resources will attempt to shield children from the direct effects of hunger. Therefore, in a household with children, a scaled hunger index conceivably can convey dimensional severity.

Exhibit 8

**RELIABILITY AND GUTTMAN ANALYSIS OF CCHIP HUNGER
QUESTIONS (N=2204)**

RELIABILITY ANALYSIS

Cronbach Coefficient Alpha

for RAW variables: 0.852

for STANDARDIZED variables: 0.856

Standardized Variables

<u>Deleted Variable</u>	<u>Correlation with Total</u>	<u>Alpha</u>	<u>Label</u>
H1	0.481	0.853	HH Ever Rely on "Emergency" Foods
H2	0.543	0.846	Ever Run Out of Money for Food
A1	0.679	0.830	HH Adults Ever Cut Size of or Skip Meals
A2	0.665	0.831	HH Adults Ever Eat < They Should
C1	0.694	0.828	Children Ever Eat < They Should
C2	0.662	0.832	Children Ever Cut Size of or Skip Meals
C3	0.653	0.833	Children Ever Report Hunger
C4	0.426	0.859	Children Ever Go To Bed Hungry

GUTTMAN ANALYSIS

Coefficient of Reproducibility CR = 0.926

Minimum Marginal Reproducibility MMR = 0.721

Coefficient of Scalability CS = 0.733

Exhibits 9 and 10

Exhibit 9

Means of Risk Factors and Outcomes by Hunger Categories

	No Hunger (N=573)	At Risk (N=1199)	Hungry (N=427)
% Poverty level	106.7	98.0	84.9
% Income spent on shelter	<u>32.3*</u>	<u>38.4</u>	46.9
# bills in arrears	0.63	1.46	2.21
# child's illnesses	1.08	1.70	2.22
# Emergency food programs used	0.13	0.33	0.55
Total # emergency strategies used	2.8	6.5	8.8

*underlined means do not differ significantly at the 0.01 level of significance

Exhibit 10

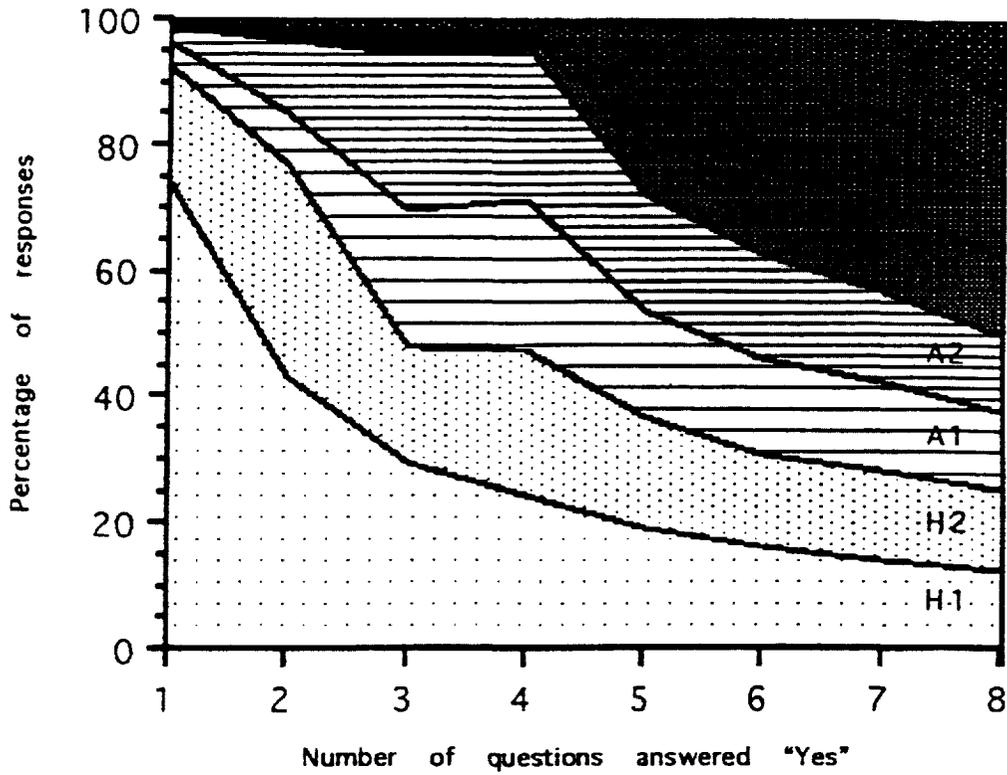
RELIABILITY OF CCHIP HUNGER SCALE IN EACH OF 5 SITES

SITE	COEFFICIENT ALPHA
MAINE	0.803
RENSSELAER COUNTY, NY	0.859
INDIANA	0.823
SOUTH CAROLINA	0.887
UTAH	0.865

Exhibit 11

Distribution of responses to hunger questions
5 sites combined

18 Jan 1994



ASK

Exhibit 12

CCHIP HUNGER ITEMS

H 1 Household ever rely on "emergency foods"

H 2 Ever run out of money for food

A 1 Adults ever cut the size of or skip meals

A 2 Adults ever eat less than they feel they should

C 1 Children ever eat less than they should

C 2 Children ever cut the size of or skip meals

C 3 Children ever report hunger

C 4 Children go to bed hungry

The stem questions of the CCHIP hunger index exhibit temporal severity (see Exhibit 13). The CCHIP scale scores are on the X axis; the Y axis shows the average number of days per problem. You can have a maximum of 30. The boxed plots illustrate the number of mean days marked by the plus sign and the number of days at the 25th, 50th, and 75th percentile. Households with a score of 1 have a mean of approximately 4 days and a median of 2 days per problem, whereas households with a score of 8 have mean days of approximately 9 and a median of approximately 8½ days per problem.

So, as you can see, there is a clear trend. The higher your hunger score, the greater the number of days you experience each problem, thereby providing an indication of temporal severity.

Even though the CCHIP hunger survey was developed to survey a targeted population, I think the lessons that we have learned from conducting 6,450 interviews with low-income families across the United States can be informative for the effort to develop a hunger measure for use in a general population. Before beginning this round of CCHIP surveys, we added several of the hunger items to the questionnaire that had been developed by the USDA, NHANES, and the Cornell working group on food security. These data were analyzed as part of our recommendations to this gathering.

As USDA and HHS set forth their goals for collecting data, we have to make sure that we understand whether we're trying to develop a screening tool or establish a basis for allocating limited resources to alleviate a specific problem. If the former is the goal, you may want to increase the sensitivity of the measure with the understanding that you may have included false positives. If the latter is your goal, you probably want to develop a measure that is reasonably sensitive, so that you don't miss people who need assistance, but also quite specific, so that you don't provide benefits to those who don't need them. Although we firmly believe that food security is a laudable goal and food insecurity may be a sensitive screening tool, a construct of household hunger may be a more specific measure amenable to public-policy program intervention.

This exhibit presents a sensitivity and specificity analysis, with several single hunger items and two scaled indexes (see Exhibit 14). As you can see, the total sensitivity and specificity scores are highest for scaled items. If you use individual items, they are usually either highly sensitive but have low specificity, or vice versa. So, we would suggest and recommend a scaled hunger measure.

Exhibit 13

Distribution of hunger problem days by hunger scale score

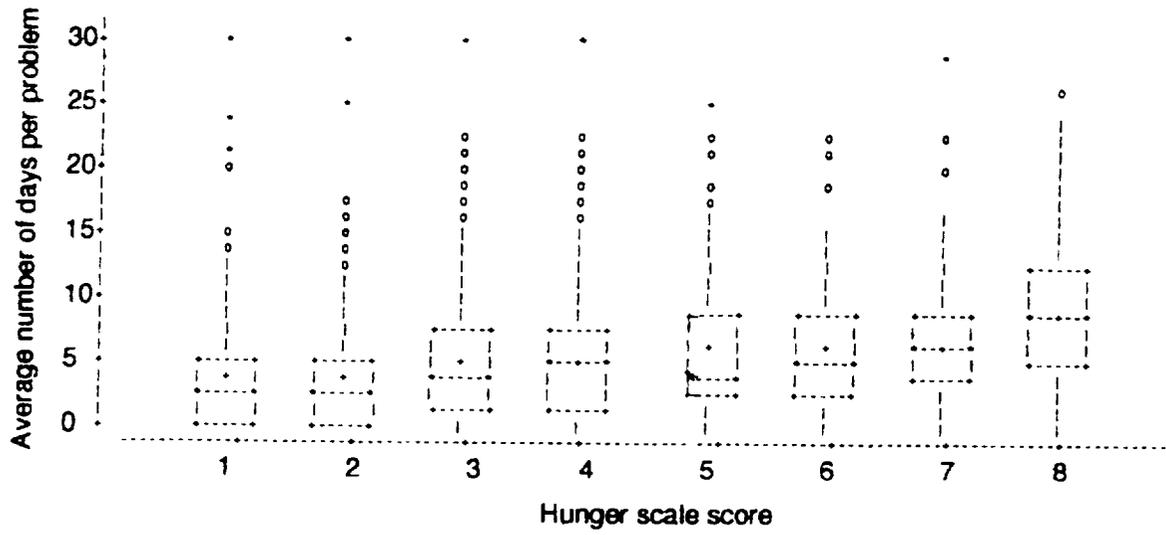


Exhibit 14

**Single questions and Multiple question measures:
Sensitivity and Specificity with respect to CCHIP Hunger**

	Sensitivity	Specificity	Sens + Spec
<u>Single questions</u>			
Food adequacy			
Often not enough	21.1%	97.7%	118.8
Sometimes or often not enough	92.9%	67.7%	160.6
Behavior			
Resp. not eat whole day	42.9%	91.3%	134.2
Money related			
Food money not enough	88.3%	56.8%	154.8
Buying/serving less expensive foods	98.8%	11.1%	109.9
Not paying bills on time	89.9%	38.0%	127.9
Worry questions			
Food not enough	91.3%	63.5%	154.8
Food not nutritious	74.4%	70.1%	144.5
<u>Multiple question measures</u>			
Scale 5b (>3/5)	92.0%	81.6%	173.6
Scale 5c (>3/5)	87.1%	85.4%	172.5

We have come up with three different versions of a potential general population index after a great deal of exploratory analysis of our combined data set based on all the CCHIP questionnaire items, including some of the Cornell scale items, and the one USDA/NHANES food-adequacy question (see Exhibit 15). The resultant index has just five items—three adult and household-level questions from CCHIP, the one USDA/NHANES question, and one of the Cornell questions. The only difference in the three versions is the weighting of the three response categories for the USDA question. In version 5a, "sometimes not enough" is coded as "1", and "often not enough" is coded as "2" resulting in a 6 pt. scale. In version 5b, "sometimes not enough" is given a value of "0", whereas "often not enough" is valued at "1". In version 5c, "sometimes and often not enough" are valued at "1". We believe these scales have face validity because they include items to ascertain the perception of not having enough food or resources for food in the household, as well as individual perception of not having enough food and behaviors indicating insufficient food intake. We have tested the validity, both construct and content validity, of the indexes. Versions 5a and 5c exhibit content validity with alpha coefficients of greater than .8. (see Exhibits 16a and 16b). Using version 5c, we have conducted initial cut-point analyses. As Exhibits 16a and 16b illustrate, there is a strong trend in the means of risk factors and outcome variables with increasing scale scores, with substantial differences between the score of 0 and 1 and again between scores 3 and 4, suggesting that they are appropriate cut points.

We have also tested its construct validity by computing associations between risk factors and outcome measures and this scale (see Exhibit 17). As illustrated, scale version 5c coheres in expected ways with a theoretical model of domestic hunger. So, we have tried to do a lot of work in preparation for this gathering, and we look forward to working with all of you in the future on this issue.

Thank you very much.

SHARRON CRISTOFAR: Thank you very much, Cheryl. The first two presentations discussed hunger surveys. That was the theme and the purpose of both the CCHIP and Cornell work. The next two presentations are somewhat different because the USDA and NCHS surveys are not hunger surveys; they are general population surveys, each having a specific orientation. The USDA surveys examine food use and food consumption by households and individuals and the NHANES is a general population survey of extensive health indicators, including diet. Both of these government surveys have included hunger questions, however. Specifically, a basic food-sufficiency question developed by USDA has been included in all the USDA food-consumption surveys since 1977. Just for historic interest, we should note that this question was devised originally by a working group headed by Betty Peterkin and including Molly Orshansky. A variant of the same food-sufficiency question, plus several of the basic CCHIP hunger questions also were adapted for use in the latest NHANES. Therefore, these surveys provide results that can show associations between those particular hunger questions and many other kinds of dietary and health indicators.

Exhibit 15

**General Population Hunger Measure:
Some versions examined using CCHIP data**

	Scale 5a	Scale 5b	Scale 5c
<u>CCHIP questions</u>			
H2: Ever run out of money for food	1	1	1
A1: Adults ever cut or skip meals	1	1	1
A2: Adults ever eat less than they should	1	1	1
<u>Additional questions</u>			
Resp. ever not eat for a whole day	1	1	1
Food adequacy question:			
Sometimes not enough	1	0	1
Often not enough	2	1	1
Maximum score	6	5	5
Alpha coefficient in CCHIP data	0.84	0.78	0.84

Exhibits 16a and 16b

Exhibit 16a

CCHIP data Risk factor and Outcome means for different levels of proposed general population hunger scale

	Scale value					
	0	1	2	3	4	5
% Poverty level	108	96	99	99	90	77
% Income spent on Shelter	32	40	38	40	43	48
# Bills in arrears	0.7	1.3	1.3	1.7	2.1	2.3
# Child's illnesses	1.2	1.6	1.7	1.7	2.0	2.6
# Emergency food programs used	0.14	0.30	0.31	0.36	0.45	0.69
Total # emergency strategies used	3.4	5.7	6.7	7.5	8.4	8.9

Exhibit 16b

CCHIP data risk factor and outcome means for different hunger categories of the proposed general population hunger measure

	Hunger category		
	'No Hunger'	'At Risk'	'Hungry'
% Poverty level	108	97	85
% Income spent on shelter	32	39	45
# Bills in arrears	0.7	1.5	2.2
# Child's illnesses	1.2	1.7	2.2
# Emergency food programs used	0.14	0.32	0.54
Total # emergency strategies used	3.5	6.5	8.6

Exhibit 17

Correlation of Hunger scales and questions with Risk factors and Child Illness Outcome

	Income	%income on shelter	# bills in arrears	# child's illnesses
<u>Scales</u>				
CCHIP (0 -8)	-0.16	0.10	0.35	0.24
CCHIP (0/1/2)	-0.15	0.10	0.31	0.21
Scale 5b	-0.18	0.11	0.34	0.24
Scale 5c	-0.19	0.10	0.35	0.24
CCHIP Adult (0-4)	-0.15	0.10	0.35	0.23
CCHIP Child (0-4)	-0.12	0.07	0.24	0.18
<u>Questions</u>				
Food adequacy quest	-0.19	0.08	0.30	0.20
Worry not enough	-0.14	0.08	0.28	0.20
Worry not nutritious	-0.04	0.05	0.21	0.15
Food money quest	0.03	0.04	0.22	-0.12

The next presentation, by Steven Carlson, is on the basic food-sufficiency question developed for use in the USDA national food surveys. Steve is Director of the Family Programs Staff in the Office of Analysis and Evaluation at FNS. He joined OAE in 1981. Steve's major responsibilities, besides keeping his food-security research team in line, include preparing legislative analyses, cost estimates, and regulatory reviews, and he is responsible for development and direction of food-stamp and other related policy research and analysis at FNS. He graduated from the College of William and Mary and has an M.A. in experimental psychology from the University of Virginia. Please welcome Mr. Carlson.

STEVE CARLSON: Thanks, Sharron. I'm at least at a spiritual age at which being Mr. Carlson bothers me. That's my father. I've also had the disconcerting realization, as my career in Federal service has progressed, that I have fewer and fewer thoughts of my own. I serve more as a mouthpiece or a spokesman for others. That was never more apparent to me than as I contemplated what I am about to do this morning. I'm going to describe research that I did not do, that the staff I lead did only a small part of, and in words that are not my own writing. I'm feeling, personally, more and more superfluous.

But, with that caveat in mind, please allow me to accept all responsibility for anything that I say now that is incorrect or untrue, but allow me to pass on any credit for the insights you may see in what you are about to hear to Gary Bickel and the other members of my staff, including Sharron, Margaret Andrews, and Bruce Klein, who have been working together as our FNS food-security research team. They all have worked very hard on this entire effort for at least 6 months.

As Sharron has mentioned, what I intend to do is to describe a little bit about the one key food-sufficiency question that has been included, with some minor variation, in national surveys administered by USDA and by the National Center for Health Statistics. I also want to summarize for you some of the reasons why we think the information from this question may be useful and important.

To begin with, I want to indicate what we are talking about when we refer to the so-called "food-sufficiency question." This is the basic question included in all the food-consumption surveys administered by USDA since 1977 and it asks respondents the following question: "Which of the following statements best describes the food eaten in your household?" (Parenthetically, some surveys have given the question a time reference to link it to the past month or some other time period and other surveys have asked it with no time reference.)

There are four options offered to the respondent in answering this question for the household. The first option is, "enough of the kinds of food we want to eat;" the second is, "enough but not always the kinds of food we want to eat;" the third is, "sometimes not enough to eat;" and the fourth is, "often not enough to eat." So, in one sense, we have here a direct, simple indicator of respondents' perception of the adequacy of their household food. The only complexity, and a possible source of confusion in the question, is that it includes both a food

quality dimension—the kinds of food we want—and, simultaneously, a food quantity dimension in the same question.

The last two response categories, "sometimes" or "often not enough to eat," are the important ones for our concerns today. They may provide a basic first-cut indicator of hunger in the household, at least sometimes and for at least some household members. The second response is more ambiguous. It may indicate another less severe order of food problem in the household, short of actual hunger, but possibly providing a potential indicator for some other aspect of food insecurity.

The NHANES version of the question that Ronette Briefel will speak to in just a few moments simplifies it to focus only on the quantitative dimension. Here, the same question is used, "Which of the following statements best describes the food eaten in your household?" but with only three responses: "enough food to eat," "sometimes not enough to eat," and "often not enough to eat."

In either version of the question, it surely is by far the simplest of the several types of direct food-insecurity indicators and measures that we are considering today. I think that is clear from the discussion that we have heard already from Christine Olson and Cheryl Wehler. However, this modest measure can be recognized as holding some pride of place in one respect: it has by now, including the latest NHANES, been included in at least 12 independent national surveys, as well as in some smaller ones, over the period since 1977. These have included all the national food-use surveys, plus some smaller ones, conducted by USDA. They include the special Extended Measures of Well-Being module included in the recent SIPP panels—the Survey of Income and Program Participation. And they include NHANES, which I think is notable in several respects, one of which is that this is the first national data set in which this food-insufficiency measure occurs simultaneously with a series of other independent food-security indicators, including those that NCHS adapted from the CCHIP survey that Cheryl just described. So, now we can begin to analyze how these different independent indicators work together. At least on its face, we now have a remarkably large, consistent national data set extending over 15 years on this one very simple, very direct measure of food insecurity among low-income American households.

This is part of the reason that many of us think this particular indicator does have some role to play within the full complement of more detailed food-security indicators and measures that we expect and hope to develop. These data, for what it's worth, show that approximately three to four percent of the entire United States population, on a household basis, reported that they sometimes or often do not have enough to eat. This figure has remained remarkably consistent within the USDA surveys dating back to 1977.

These data need much more analysis. In particular, we need to know much more about the relationship between this simple food-sufficiency measure and the other measures of food insecurity that we have discussed so far. One of the things that we do know about the food-sufficiency-question measure is that it has received several independent kinds of validation in at

least three separate studies that I want to describe briefly today. The first of these studies demonstrated that responses to the question—that is, respondents' self-reported perceptions of food adequacy within their households— corresponded very closely to some traditional economic measures of household food consumption behaviors. I run a double risk in describing the work at this point, in that its author, Peter Basiotis of the Human Nutrition Information Service, is with us this morning and I fear he will jump up midstream and correct some gross misstatement.

But Peter approached this problem several years ago with a very straightforward, economist's perspective. He asked himself, if you will, what would a household be likely to do when it is running out of money to buy its food? Economic consumption theory suggested two things. One is that the household members very likely will first reduce their expenditures on food by buying cheaper items; you make your dollar go farther. They will economize by substituting cheaper and cheaper foods for the things that they really would prefer to be eating, but they probably won't go hungry, not quite yet. At this stage, they will have a food quality problem, if you will, but not a food quantity problem.

Eventually, the possibilities for this kind of economizing through substitution are used up. If income keeps on falling, the household then comes to a threshold where the only way to economize any further in the food budget is to cut back on the quantity being purchased and eaten. This is the threshold where the household may begin to experience actual resource-constrained hunger, simply not having enough to eat.

To test this hypothesis, which is an economic model of how households cope with a reduction in their resources for food, Peter examined the data available in the food-use surveys conducted by HNIS. First, he divided these data into three groups: those folks who report that they always have enough of the kinds of food they want; those who reported that they had enough, but not always what they wanted; and those who reported that sometimes or often, they didn't get enough to eat. With the food consumption data for low-income households grouped this way, Peter estimated some very standard, long-established economic measures of households' consumption responses to declining incomes for each of the three groups. First, he estimated households' normal responses in terms of changes in the average price of the foods they consumed when their incomes and total food spending declined. Then, he estimated their response to declining incomes in terms of changes in the quantity of the food they consumed. (Quantity in this instance was proxied by the total calorie content of the food consumed.)

What Peter's hypothesis predicted was that these standard, objective measures of consumption response to declining household resources would show very different results across the three groups of households, separated according to how they perceived and reported their own food sufficiency. The test of the hypothesis was to compare the size of the response of eating cheaper foods to the size of the response of eating less food within each of these household groups as their incomes fell.

To do this, Peter calculated and compared the standard economic measure—the elasticity of consumption response to declining resources—for each of these two alternative ways of

economizing in the household food budget, the cutting back of food quality versus the cutting back on food quantity. Then, finally, he looked at the comparative size of these two elasticity estimates—the estimated elasticity of reduced food quality and the estimated elasticity of reduced food quantity—within each of the three self-identified household groups.

What Peter found with this test of the hypothesis was exactly what was predicted and exactly what common sense would lead us to expect. Specifically, for the group of low-income households reporting no food-sufficiency problems, neither elasticity estimate was significantly different from zero. That is, declining incomes for these households hadn't yet put any significant pressure on household food budgets. People essentially maintained both quantity and quality of their preferred diets despite declining incomes.

For the second group of households, those reporting problems with food quality, the food price, or quality elasticity was high and highly significant, whereas the food quantity elasticity was low and barely significant. In other words, their food quality, as measured by price, was declining substantially, whereas the quantity of food consumed was changing only slightly. Finally, in the lowest partition, where households reported food quantity problems, the two elasticities switched places. The food price or quality elasticity now is not significantly different from zero. That is, the possibilities of further economizing through continuing substitutions of cheaper foods have disappeared, and the food quantity response is now quite high and highly significant. Now, the response to declining income becomes simply less to eat.

So, we feel that Peter's work is very important in showing that the self-reported perceptions of food adequacy by household respondents are perfectly consistent with standard objective economic measures of household food-consumption behavior.

The second study that tends to confirm the basic validity of the households' self-report on food sufficiency found that the quantitative component of the measure is also significantly associated with traditional measures of households' nutritional status, the nutrient adequacy of household members' food intakes in relation to established dietary norms. This work also was conducted by Peter Basiotis in collaboration with Sharron Cristofar, who was then at HNIS and now is on my staff at FNS.

The Basiotis-Cristofar study was based on the combined 1985 and 1986 low-income samples of the USDA Continuing Survey of Food Intakes of Individuals. It shows some fairly significant and direct relationships between reported food sufficiency and the nutrient adequacy of intakes, especially for adult women with young children. Motivation for the study was to show that the simple food-sufficiency measure can provide a valid indicator for households at *nutritional risk, and the findings were such that they essentially meet that objective.*

Finally, the third and most recent of the studies that I want to describe briefly demonstrated the possibility of creating composite scaled measures of food deprivation and food dissatisfaction, constructed from several diverse types of indicators, including the USDA food-sufficiency indicator. In these experimental measurement scales, the separate qualitative and

quantitative response categories appeared to play quite different roles. This study was done for FNS by two analysts at Mathematica Policy Research, Alan Sherm and Tom Fraker, under the guidance of Margaret Andrews of our FNS research staff, who is the project director for that effort.

This study was an exploratory analysis of some limited food-sufficiency and food-security data that were collected as part of FNS' evaluation of the effects of converting food stamps to cash in San Diego and Alabama. We made use of those demonstrations to test a battery of questions that included both the food-sufficiency question and several other kinds of indicators dealing with whether, in the past month, the household experienced any days without food or

pattern in a cross-sectional survey? We don't yet know the answer to that question. We don't yet know the answer to a number of other questions concerning the measurement of hunger and food security, but I hope that throughout this day as our time together progresses, we'll have a chance to talk about these kinds of issues further.

SHARRON CRISTOFAR: Thank you very much, Steve. Our next presenter is Ronette Briefel. Dr. Briefel is Coordinator for Nutrition Monitoring and Related Research at the National Center for Health Statistics, Centers for Disease Control and Prevention, Department of Health and Human Services. She is responsible for coordinating nutrition monitoring activities at HHS and serves as co-chair of the ten-year comprehensive plan implementation working group. She has been with the National Health and Nutrition Examination Survey, NHANES, for the past 10 years and has had the primary responsibility for planning the dietary and nutrition component for NHANES III.

This morning, we hope that Dr. Briefel may be able to share some of the preliminary results from the most recent NHANES study with us and maybe she can tell us a little about how the food-sufficiency questions worked in that particular data set. Welcome, Ronette.

RONNETTE BRIEFEL: Thank you very much, Sharron. I am very happy to be here and very happy that we do have some data to show you today, thanks in great part to the coauthor on this work, Katherine Alaimo, who works as my colleague at the National Center for Health Statistics and who worked throughout the weekend to get these new data. Literally, we have had the data since only about Tuesday of this week, so you're the first group that will see some of our provisional findings.

I would also like to thank the USDA Organizing Committee. It has been a pleasure to work with the entire group at FNS and the larger interagency working group. We see this as a collaborative effort, where we need to pull together and work towards developing a standardized measurement tool that we can put into a number of national nutrition-monitoring and surveillance studies and that can also be comparable to those used in the research setting and at the State and community levels.

So, with that, I will try to move quickly, as I know we're already into our break time. I will be sharing with you provisional food-sufficiency data collected in the third National Health and Nutrition Examination Survey, or NHANES III. I have three primary objectives: first, to describe the characteristics of persons with reported food sufficiency problems; second, to briefly describe some methodological issues with respect to designing survey questionnaires; and third, to share with you our research plan for these data from NHANES III.

NHANES III, as many of you know, is a national survey periodically conducted by NCHS to assess the health and nutritional status of the United States population. In this survey we began at ages 2 months and older and had no upper age cutoff. The survey design included over-sampling of children under 6 years of age, persons 60 years and older, Blacks, and Mexican-Americans.

I will be reporting provisional data for the first phase of NHANES III, which covered the time period 1988 to 1991. This was a nationally representative sample in which over 17,000 persons were interviewed and over 15,000 received a 3½-hour standardized medical examination. Phase 1 ended in October of 1991 with an overall response rate of 86 percent to the interview component and 77 percent to the examination component.

It is important for me to note up front the limitations of these data. This is, again, a general national health survey, so it does not include a number of groups that might be at risk of hunger, such as homeless persons or institutionalized persons or migrant workers. We also did not determine psychological, social, or cognitive aspects of hunger in this survey. Again, the data are self-reported from family respondents and individuals.

Food security was a high-priority topic when we began planning the NHANES-III nutrition component back in the mid-1980's. For planning purposes, food insufficiency was defined as you see here: an inadequate amount of food intake due to lack of money or resources. Thus, the questions in the survey were specifically designed around this definition. We took the tack of going with the quantitative approach, looking at the quantitative aspect of food security.

After developing, pilot testing, and evaluating a number of questions that were derived from the CCHIP questions, from the USDA food-sufficiency question, and from talking with Kathy Radimer at Cornell, we settled on a set of questions aimed at the family level, which are collected in the household interview, and at the individual level, which are collected in the examination center.

The following information is collected for the family level from a family respondent. We asked about whether there is enough, sometimes not enough, or often not enough food to eat in the family, the number of days in the past month with no food or money, reasons for the problem, and then in Phase 2 of the survey, based on the advice of a number of people, many of whom are in the room today, we added two questions on skipping meals in adults and skipping meals in children for the Phase-2 portion.

Provisional data from Phase 1—these are weighted population data—show that about 4 percent of all individuals had a family respondent report that the family had sometimes or often not enough to eat. So, as Steve Carlson noted earlier, 4 percent seems to be holding true for 1988 to 1991. An asterisk represents an estimate where the coefficient of variation exceeds 25 percent, and thus the estimate should be interpreted with caution.

Looking at the responses to the family food-sufficiency question by poverty status, which was defined as below 100 percent of the poverty level as defined by the Census Bureau, we see that about 16 percent of those in poverty have a reported food-sufficiency problem based on this family question. This is combining the "sometimes" and the "often not enough." By comparison, about 1.6 percent of those at or above the poverty line report a food-sufficiency problem in this sense.

Looking at several different poverty breaks based on the poverty income ratio, or PIR, which considers family income and family size, about 13 percent of individuals have a problem in the group at or below 130 percent of poverty. This is a key eligibility cutoff for food assistance programs. Moving away from poverty, and as the PIR increases, you can see that the reported food-sufficiency problem decreases fairly dramatically.

Then, looking at the provisional data by race and ethnicity, since these are the population groups that were over-sampled, Blacks and Mexican-Americans, we have very reliable estimates for these groups. You see that about 3 percent of non-Hispanic whites reported a problem compared with 7 percent of non-Hispanic Blacks and about 15 percent of Mexican-Americans.

Next are the reported reasons that the family respondent gave for not having enough food. As you might expect, 98 percent reported the reason as being lack of enough money, food stamps, or WIC vouchers. Eight percent reported transportation to be a problem. Two percent reported a problem with having working appliances, such as a stove or refrigerator, and about 3½ percent reported other reasons such as a health problem or a disability. The respondent could answer more than one choice, so these add up to more than one hundred percent. These responses indicate that while the predominant reason is lack of money, it is important to try to account for other sole or contributing reasons for the problem as well.

Of those respondents who answered "sometimes" or "often not enough to eat," we then asked how many days in the past month there was no food or money to buy food. Twenty-nine percent reported that there were no days when they had a problem in the past month. You can see that there is a distribution of days, with up to 5 percent reporting that they had a problem for half or more of that previous month. So, this gives us some idea of the severity or the duration of a problem for the past-month reference period.

Moving on from the family level, we then asked individuals a set of questions at the time they came in for their examination, which also included anthropometry, hematological and nutritional biochemistries, a dietary status assessment, and a health-status assessment. Individuals or their proxies for those who are under 12 years of age responded to the number of days they had no food or money to buy food, how often they skipped meals, and whether they hadn't eaten at all. This was asked for both the past month and for yesterday, which happens to be the day of the 24-hour recall.

We compared how individuals would be categorized, based first on responses to the comparable family questions that were asked and then on the individual questions that were asked, using the past month as the reference period. Those were comparable questions asked in the two different places. For this table, a family problem is defined as answering "sometimes" or "often not enough to eat," with 1 day or more as a problem in the past month, and the reason given as a lack of money. The individual problem as defined here is very similarly defined as 1 or more days in the past month with no food or money to buy food, and the reason as a lack of money.

These are provisional data for over 15,000 examined persons. About 2 percent of all individuals have a food-sufficiency problem, based on either the family or the individual questionnaire, but they are not necessarily the same people. Although 97 percent are classified the same way on either basis, either with a problem or without a problem, about 3 percent would be classified differently depending on the question used. We think that the best approach will be a combination of using the family questions, which are answered by the most knowledgeable family respondent, in combination with the individual questions. Our assumption here is that any individual in any of the three boxes there, giving either a positive response to the family problem or to the individual questions, is at risk.

Over the next few months, we will be conducting additional analyses to identify at-risk population groups, to relate the food-sufficiency data to the dietary intake and nutritional status information, and, hopefully, to discover specific indicator questions that we can link or correlate with the dietary or nutritional status indicators. We hope to get these data out for publication and share them with everyone as soon as we can in the next few months. We will also work closely with USDA, so that any pertinent NHANES III findings can be built into the planning for the 1995 CPS survey.

Long term, we will also be beginning our planning for the next NHANES survey, which is scheduled to begin in 1997. So we are very anxious to further develop and do some more research and work with all of you to better develop an instrument that we can field in 1997.

Thank you.

SHARRON CRISTOFAR: Thank you very much, Ronette. Well, probably needless to say, we have gone way beyond our time limit. Time goes very quickly when the information is so rich. What has been suggested to me is that perhaps instead of an open discussion now, that during the break you might grab the person that you want to talk to, and talk during that period of time. It is almost time for the next session to begin. So why don't we take a really short break, maybe 10 minutes, and we will keep ourselves on schedule as much as possible and convene back here for the second session.

Session II: Food Quality, Access, and Coping

Chairperson: Margaret Andrews

Food Access: Integrating Community and Household Measures

Mark Winne

**Gauging the Public Concern with Food Quality: Relevance for Food Security
Measurement**

Allen Rosenfeld

Measurement of Coping Behaviors as an Aspect of Food Security

Richard Scott

MARGARET ANDREWS: Let's get started now. I would like to welcome you to this second session. My name is Margaret Andrews and I am one of the FNS organizing committee.

In this second session, we hope to move the discussion beyond the more central definitions of resource constraints and hunger into some of the wider dimensions of food security. Particularly, we want to look at the concepts and issues involved in the assured ability to acquire nutritionally adequate and safe foods and the coping strategies used by families as they find themselves in precarious situations and anxious about food security.

We are very lucky today to have a number of speakers who have experience not only in measuring and research regarding aspects of food security and hunger, but in actual working with communities and groups to try to improve the food access and reduce hunger in their communities.

Our first speaker is Mark Winne, who is the executive director of the Hartford Food System, which is a nonprofit agency that works on food and hunger issues in Hartford, Connecticut. Mark's work with the food system has brought him into contact with a number of groups and has led to the establishment of a number of projects in his community. His topic today is going to be on food access, integrating community and household measures. Welcome, Mark.

MARK WINNE: Good morning, and thank you, Margaret, for bringing me here. It was actually a lot colder in Connecticut. I probably won't comment on how wimpy the Washingtonians are when it comes to hard weather. In New England, this is just good barbecue weather, so I don't know what the problem is.

I'm going to talk about food security in the context of a local community food system, because that is my experience for the past 15 years in managing the Hartford Food System and other related projects. I feel that in order to address effectively hunger and poor nutrition, we must also know how our local food systems actually work. We need to know the barriers that exist at a local level. Certainly, we have spent some time acknowledging over the years through work of advocates and others the issue of purchasing power among low-income families. But we also need to know about the limited access to affordable, quality food, which is a prevailing condition in many of our low-income communities, especially our urban areas or inner cities. We need to understand a little bit better the limited access to food and nutrition information that is also a barrier for low-income families. If we're talking about food security and food insecurity, I think that is what we're talking about, the low-income communities and the barriers that they face with regard to access and information.

To understand these barriers, we must go into the low-income community, into the urban and rural communities where these problems exist. We also need to understand for ourselves what a prevailing standard is for securing food and what is the norm, how most of us go about getting food, not just how we cope but what do we normally do. I normally get in my car and

go to the supermarket. About the only inconvenience I experience is maybe bringing my 8-year-old son with me and having a confrontation in the aisle about what kind of cereal to buy. For others, it's a much more complex situation and I think we need to understand those complexities to adequately define food security.

Some of the methods that we have employed, and others have employed around the country to look at food security on a more comprehensive community level, would include market research, the same kind of market research that is done by the supermarket industry in looking at where to place a food store. What is the buying power in the area, what are the demographics, what is the competition like. But more precisely, knowing what is the quality of the food that is available in the area.

We have also done a number of shopper surveys, simply going out on the street in low-income communities and asking people where they shop, why they shop there, what is their first choice in terms of a place to buy produce, meat, fish, other items, and trying to develop a pattern of where people are going and some of the ways that they overcome barriers that exist in their community. In particular, I am talking about the lack of normal channels from which to purchase food. Again, we're talking about a lack of supermarkets or quality food stores in low-income areas.

We also need to do price comparisons in communities. We need to have some sense that there is some difference in the price of food in an area that is accessible to low-income families. We generally assume that the prices are lowest at the major chain supermarkets and that they are generally higher at the small stores which predominate in low-income areas.

We also employ focus groups, which I will spend a little time discussing in a few moments, as a way to get at a more personal level of how people go about securing food, how they make decisions, what influences them when they choose food and when they go shopping.

So what is it we want to know about our communities? We want to know where people shop and we want to know why they make those decisions. Is there something about a particular store or a particular preference that they have for certain kinds of food that can be met from one kind of outlet versus those that might be available in their community.

We want to know the true cost of acquiring food. I suppose we could refer to this as a coping cost. At least, that is a term I'll use, although it is probably not a very precise one. But we need to go beyond simply the fact that a can of tuna fish costs a certain amount at one store and it costs something else at another store. We need to know what is involved in getting to the store, the transportation costs, especially for folks that don't own an automobile, who must rely on public transportation or taxis or on people who simply make their living taking people to the store at the first of the month and taking advantage of them.

I referred to the problems I have when I take my young son shopping and how I find when I come to the checkout aisle that I didn't really buy what I wanted to buy when I came into

that store. My little friend influenced me and the quality isn't exactly what I wanted. Now, if I have two or three children in tow and that is how I normally do my shopping and I'm doing a major shopping at the beginning of the month because that is when I have my food stamps, it is a struggle and I don't think the decisions I am making under those circumstances are as good as I would make under less stressful circumstances.

We also need to know that people do buy a lot at the beginning of the month and sometimes that results in spoilage and sometimes it results in people making choices that may not be the best ones in terms of dietary considerations. I know a lot of folks that buy bulk meat, large quantities of meat at the beginning of the month, because they have the money and also prices tend to be lower. The small stores in our city are merchandizing to that low-income household who does have a lot of money at the beginning of the month. So the price is lower on a per-unit basis, but I think there may be other costs related to diet and spoilage.

We also need to know something about the competitive nature of the food industry. What is driving the food retailers today to decide to open a store in a certain area, to close a store in a certain area, because this ultimately influences food security in our urban areas and it influences food security in rural areas as well.

We need to know the number, the location, the size, and the merchandising practices of food stores. This is not as routine as you might assume. There is a tremendous variation among supermarket chains. Some know how to effectively merchandise and market to inner-city shoppers, to a diverse consumer base. Some know how to operate those kinds of stores in urban areas. The Pathmark chain, in particular, in the Northeast has a good reputation for being able to operate inner-city stores, while many of the stores in my part of New England don't really know how to do it well, and as a result, they tend to avoid establishing stores in inner-city areas.

We need to know something about the negative impacts of limited competition. The fact that there are not enough stores in a certain area implies that prices will generally be higher, that quality will be lower, selection will be less. We also found in Hartford, and I believe this is true in other urban areas, that because of a lack of competition among chain supermarkets, there is a practice of not giving as much value in terms of special couponing. Store coupons, for instance, were not made available to Hartford residents in the same way that they were made available to suburban residents in our Hartford area. This is based on some research that we did last year. As a result, the urban family didn't have the same buying power, the same advantage, as a knowledgeable shopper would, especially a knowledgeable shopper located in a suburban area. These are coupons that are given out through the Sunday advertising circulars and newspapers.

We also need to know something about how the consumer makes decisions, how they gather information. I think this is a major problem with the food industry, we as consumers don't have that much information. There is a cost involved in acquiring that information. The term that economists use is information that is asymmetrically held. The food stores know about the product, they know the price, they know the quality. The consumer doesn't really know that.

or they have to work a lot harder to find out that information. That is a special problem with low-income families where they have to work a little harder to get that information. Low literacy levels will also affect their ability to acquire that information.

In order to understand our community food system, I also think we need to know something about our regional food system. There is in my opinion a relationship between our farms and our urban centers. Is there an adequate market, for instance, and adequate outlets for farm produce in a given area? Do farmers have access to markets? Quality and price and accessibility can all be influenced by the ability of a regional farm sector to interact with the urban area where there is a large consumer base.

We need to know something about the quality of our food distribution infrastructure. How easily can food move around, warehousing, transportation, et cetera. I think we're discovering how important infrastructure can be, as we look at Los Angeles' ability to cope as their freeway system has more or less collapsed and while they sit in the middle of America's food basket, the food simply can't move into the city at this time, or experiences severe difficulty.

Other indicators of community food security that we need to assess would include the quality of nutrition education that is available, its extent, its appropriateness for the particular population, how well do we target that education. We need to know about outreach and advocacy vis-a-vis food assistance programs in particular. Are there groups available to work with low-income families to make sure that they are able to acquire the kind of food assistance

that is there? We find time and again a major gap between what people know about food assistance and what the reality is, or the perception gap. As a result, people simply don't apply for food stamps or WIC or some other food assistance program.

We need to have some sense of whether or not we are effectively targeting assistance to special-need groups, such as the elderly. Are there transportation services available that serve the elderly, or special nutrition services? I think it is also important that we know whether or not local government and State government are participating in food issues. Food policy councils and commissions are a concept that has been developing and taking hold across the country, and they have proven to be an effective way to bring the forces of local government to bear on food problems. That is another intervention that can be effective.

The groups tend to be somewhat identical. They may be all women who are participants in the WIC Program, or at least they are the main shopper for a household.

We start off talking to them about something easy or simple, like their children, or ask them a question about what is their favorite vegetable. In other words, we try to make this an easy, friendly way for them to divulge more important information. We make sure the groups are led by people who are similar to the group itself.

We use these groups to try to get at people's real sense of what they like about a certain store, for instance, or why they shop somewhere as opposed to another place. What do they think about—what are their own taste preferences? What are their own food traditions? Culture has a major influence on people's food choices. We need to distinguish a diet that is predominantly a West Indian diet from a Puerto Rican diet from an African-American diet. There are many subtleties and we discover them as we work through these focus groups.

We discover how people acquire information, what influences them. Certainly the impact of TV is significant. We need to know that if we're going to develop effective education programs. We need to know what other influences they have in their lives, how did they learn. They often learned from their own mothers. That is their tradition and they impart that tradition in turn to their children. We learn also that a major motivating factor in their lives is their children. We have heard time and again how decisions are made to feed the children first, before themselves, but at the same time they are making a decision to try to do the right thing by their children.

In closing, I'll just summarize the factors that I think need to be considered in looking at a community food system, what it is that will define food security at a community level. Ultimately, from this I would hope that we could construct a profile of a healthy, secure food system and one that is responsive to everybody.

I would identify a healthy and responsive food retailing community. I would look at good relations between an urban center and regional food production. I would look at readily available food, nutrition, and consumer information and education, especially with regard to income, age, race, ethnicity, language, culture. I would look at effective outreach and advocacy, and I would look at effective involvement by local and State governments.

Thank you.

MARGARET ANDREWS: Thank you very much, Mark. Our next speaker is Allen Rosenfeld, who is the Director of Government Affairs at Public Voice for Food and Health Policy. Apparently, we are very lucky to have him here today because his entire office is busy working on the seafood issue, which is having hearings today on the Hill.

Allen is working at Public Voice on nutrition and food safety issues. He has a background as an agricultural economist with a Ph.D. from Cornell, but he says that sometimes

he admits it and sometimes he doesn't. I don't think he is going to talk about economics today. We welcome you, Allen.

ALLEN ROSENFELD: Actually, what is happening today is that Commissioner Kessler and Secretary Shalala are announcing FDA's mandatory HASA program for seafood. For those of you that don't know much about Public Voice, other than that we kicked Ellen Haas out not long ago and upstairs to USDA, we are pretty much the consumer seafood organization. Unfortunately, FDA decided not only on my birthday, which is today, but also at the time of this conference to launch its new program. So everybody is scrambling, and I apologize for coming here at the very last moment, and I will probably have to duck out relatively quickly. It has nothing to do with the interest and intensity with which Public Voice pursues the kind of issues that you are looking at today. We take them very seriously. In fact, we are working on the very kinds of issues that Mark Winne had described so eloquently in his presentation, inner-city food access, particularly looking at the question of competitively priced foods and the structure of the supermarket industry in major food centers. This is a very big interest to us right now. In fact, we're connecting with some universities in the Northeast to try to do some number crunching on the structure of the supermarket industry in 22 major urban centers throughout the country. So, we do take it seriously, and I think Mark is absolutely on target. If we don't include some of those indicators in a food-security survey, we're really going to be missing the ball. Access means not only access to food assistance programs. It really hits people in the communities where they shop, or where they can't shop, for that matter.

But I'm not going to talk much about that issue today. Rather, I am going to talk about a national opinion survey that we did that focuses on a specific area of food safety, that is, the use of agrichemicals to produce our food and the implications that would have on the health of the Nation as well as on the environment. I will limit my discussion to food safety rather than the environmental issues that were also raised in the study.

For those of you that haven't seen the study, this is what it looks like. It's a pretty plain presentation, but there are lots of fascinating data in here. They are based on a 20-minute telephone survey. More than 800 people in the country were accessed through a random-digit-dialing process. We didn't do it; we commissioned it out to a reputable opinion research firm. The results are, if not staggering, pretty darned eye opening. I will talk more about that a little later.

What I want to focus on today is the whole issue of whether or not we should include food safety indicators as part of our definition of food security. I'll let the cat out of the bag immediately to say with emphasis that, yes, we should. I want to commend FNS for attempting to follow the broad definition of food security that includes food quality, defined in terms of nutritional quality as well as food safety.

As you all know, traditional measures of food security or food insecurity tend to focus on adequate quantities of food, reasonably priced food, and food that might meet minimum daily requirements such as RDAs. Recently, we're seeing—and not just in the academic and scholarly

realm—a convergence of the food quality and food access issues in definitions of food security. We need go no further than the current leadership of USDA, which has made a very strong case for the fact that nutritional quality of school meals is just as important as access. You can't prefer one or the other. You've got to provide access to kids to meals that not only help them meet their minimum RDAs, but also are of good nutritional quality, so that we don't set the stage for chronic illnesses like heart attacks, strokes, and some forms of cancer later on down the road for those kids that we thought we were helping in bringing them into the school-feeding programs.

Also, in October, Senator Patrick Leahy introduced legislation that puts nutritional quality, particularly the national dietary guidelines, as a centerpiece of his effort to enact legislation that will reauthorize the Child Nutrition Act, which is coming up for reauthorization in the coming year. In addition, Congressman Kilde followed suit and incorporated some dietary guidelines language into his bill in the House.

Let's get back to the question, however, of food safety. Enough about nutritional quality. I just want to make the case in fairly simple terms that food safety, for the same reasons that we want to incorporate nutritional quality, should be part of the definition of food security or food insecurity. In other words, we incorporate national dietary guidelines into feeding programs because we're concerned about chronic health consequences down the road. We know—or those of you, in particular, who focus on food safety issues, be they pesticide residues in foods, seafood safety, meat and poultry safety, whatever, know—that chronic illnesses as well as acute illnesses can be the result of food that is not grown properly, not handled properly, or isn't given the right kind of care at the consumer level. So, food safety does have a direct impact on the health of consumers and as a result should be an indicator as to whether those people are getting what they need from the food system and can feel secure that their basic health needs are being met in the process.

Let me devote some time now to the study we did. It is called "What Americans Think About Agrichemicals, A Nationwide Survey on Health, Environment and Public Policy." We did something in that survey that was quite different than most of the surveys that have been done to look at what people think about pesticide residues in their food. Most of the surveys prior to this focused primarily on the actual levels of concern that people had about pesticide residues in food, and maybe compared them with levels of concern for other food safety hazards, such as *E.coli*, such as scombroid poisoning, if they knew what that was, in seafood, whatever the case may be. But this was within particular food-borne illness categories as opposed to looking at concerns about pesticide residues in food and comparing them with other health and environmental concerns that have nothing to do with food.

What we decided to do, given the fact that we agree with the FNS document that was circulated earlier, which raises questions about the fact that it is very difficult to simply leave it at asking questions of concern. What about broader considerations such as obstacles to doing something about their concerns, obstacles with regard to overcoming the problems that the public sees with regard to the safety of their food supply.

So what we decided to do was to look at four other types of indicators to get a handle on what the public really felt about their security with respect to food safety. Specifically, we asked about pesticide residue concerns relative to nonfood health and environmental concerns, such as second-hand smoke or air pollution from industrial and automobile sources, things that were at the time we did the survey in March 1993 very much hot-button issues and very much in the public spotlight. So as a result, we would be able to get some indication about whether people really felt that relative to other pressing issues, food safety was of paramount interest to them.

Secondly, we asked the respondents to give us some sense of what actions they felt needed to be taken to address their concerns by others. In that category, I would put particularly farmers, who are responsible for the use of agrichemicals and make business decisions that are going to affect the safety of the food supply.

Third, we asked about the need for greater access in the marketplace. Do people feel that they are getting what they need with regard to the safety of the food supply, in this case particularly with reference to food grown with little or no chemicals?

Fourth, to flesh out those interests even further and to get a better handle on how deep the concerns were, we asked them, are they willing to put their money where their mouth is, in terms of paying a little more for food that is organically grown. Are they willing to support through the taxes that they pay changes in federal policies that would better address the concerns that they have about the use of agrichemicals to produce our food?

What about the survey findings? In a nutshell, the results indicate that the population feels very insecure about the safety of the food supply with respect to this subissue of pesticide residue in their food and the use of agrichemicals to produce foods. Among other things, we found that there was strong absolute concern about the levels of pesticide residues in food and water, and relative to nonfood health and environmental concerns, the concerns about pesticide residues were very strong. In other words, when we asked them to tell us how they would rate—and we didn't give them any kind of a ranking system, but we asked them to give us an indication of how their concerns about food and particularly about pesticide residues in food stacked up relative to the threat of second-hand smoke, the threat of air pollution, et cetera. We found that pesticide residues in food was of greater concern, or of concern to more of the respondents of the survey, than those other issues by a fairly wide margin. We had responses of about 70 percent or more from the people that said they were very concerned about pesticide residues in food and water, compared to something like 55 percent for second-hand smoke and about 58 percent for air pollution.

We also asked them about their concerns relative to food safety hazards such as hormones used in beef, thinking about the BGH issue here, the threat of a food-borne illness from contaminated meat and so on, and found the same kind of response: pesticide residues in food were significantly higher, that is, the concern levels were significantly higher, than those for others.

Also, nearly two-thirds of the respondents felt it was very important for U.S. agriculture to switch to so-called natural methods of production that don't rely primarily on agrichemicals. Third, only about one-fourth of the respondents felt they had adequate access in their grocery stores and supermarkets to food that was grown with little or no chemicals. Finally, there was across-the-board support for changes in federal policy, even if it meant moving around resources and tax dollars, to promote reductions in agrichemical use. There was a definite feeling that federal policies weren't doing the job and that more needed to be done.

Now, I should point out, that for each of these indicators a series of questions was asked. We didn't just rely on one question for each of the four indicators. We asked maybe four or five questions that gave us insight into each of these particular areas. The findings were consistent across each set of questions for each of the indicators.

It raises the question, given these results, about what are their implications for low-income populations in particular that are usually considered to be most at risk with respect to the typical or traditional indicators of food and food insecurity that have been laid out—the access questions, the nutritional quality questions, and so on.

Some analysts and advocates probably would say, and I have heard this, that food safety issues are a luxury for the well-to-do in society. It is a product of affluence in America and a concern for those who have nothing better to do with their time. It is a yuppie phenomenon, if you will. What does it really have to do with low-income Americans who are, as I said, traditionally most at risk with respect to the more typical indicators of food security? We could argue the relative risks of food safety hazards until we're blue in the face and we won't come to any conclusions. But the point that I want to make here is that regardless of what we think, regardless of what the analysts think, regardless of what the politicians think, what we found in the survey was convincing evidence that these phenomena, these kinds of responses that we were getting, cut across income groups, across education groups, and across locales, urban, suburban, rural, wherever. We did extensive cross-tabulations that we didn't report in the survey, which is just what Americans think about agrichemicals. The cross-tabulations were for our own benefit. But the findings are very clear. In some cases, those in the lowest income categories were the ones who were most concerned about these food safety issues.

Now, there are probably a lot of different ways to explain this, but what I want to leave you with is, not only do these people deserve just as much as anyone else does who might shop at Fresh Field's or at Whole Foods if you live up in New England or Texas or California, they deserve just as much access to a food supply that they feel is safe, that they don't have to worry about, with regard to acute illness and chronic disease down the road.

But secondly, the empirical findings in our survey indicate strongly that we would be making a very big mistake if we did not include food supply indicators to the extent that we can generalize from these pesticide residue type responses, in our indicators and in our surveys about food security and food insecurity. Clearly, those Americans who are most typically considered to be at risk for food insecurity feel very, very insecure about the safety of the food supply.

I will leave it at that, and I look forward to your questions. Thanks for your time.

MARGARET ANDREWS: Thank you, Allen. Our next speaker is Rick Scott, who is on the faculty of the University of Central Arkansas, where he is Professor of Sociology and the Associate Director of the Honors College. Dr. Scott has been involved in the CCHIP project from the beginning, serving as a technical consultant, and since 1988 as a member of the Technical Advisory Committee. Cheryl Wehler has already given us a hint about what Rick is going to talk about. We have asked him to inform us regarding the findings from the CCHIP surveys on coping behaviors and how they are related to other measures of food insecurity.

RICK SCOTT: I'll attempt to work through this quickly, because I know it is lunchtime, but, like all professors, I have prepared a 45-minute talk for a 15-minute session. I want to thank Cheryl Wehler and Jennifer Anderson, who helped prepare this presentation today.

If one wishes to conduct survey research to determine how nonhomeless low-income families make do when faced with food shortages, a conceptual distinction can be made between intrahousehold behaviors and perceptions that point to food insufficiency and extrahousehold actions that respond to food insufficiency. Consider the former category. The perceptions refer to the direct reports of the experience of food insufficiency from a lack of money for food. The behaviors refer to the management of existing food resources in situations in which there is little or no money for food, rationing all members' food, or slightly less severely, differentially allocating food so that some members cut back on the amount consumed at each meal, or skip meals entirely.

Concerning the latter category, extrahousehold actions that respond to perceived food insufficiency refer to strategies that seek to expand food and food resources, such as relying on friends and extended family members or on food pantries or even soup kitchens.

This conceptual distinction holds that intrahousehold phenomena are indicators of hunger, that is, signs of food insufficiency from constrained resources, whereas the extrahousehold phenomena constitute responses to resource-constrained food shortages. Taken together, intrahousehold handling of existing food resources and extrahousehold actions to expand food and food resources are indicative of a broader concept, namely, food insecurity.

In the presentation today, I will examine how low-income households with children cope with food shortages, and scrutinize perceptions of hunger as well as food rationing behaviors that indicate perceived food insufficiency and the strategies relied on through behaviors such as turning to familial, convivial, behavioral, and charitable supports in responding to a condition of having too little money for food.

Three questions will be addressed, and I am really going to focus on the latter two, but I will mention all three. One, in households experiencing perceived food insufficiency, how do adult members handle existing food resources in the home? In particular, what patterns of food rationing and differential allocation are evident? Two, what courses of action do low-income

families take, working through acquisition channels outside the household to expand food and food resources? Specifically, what strategies are used to acquire food and food resources? What difference is evident in these activities when comparing households that are food insufficient with those at risk of food insufficiency and with those that are food sufficient? Three, is there an empirical difference between in-home handling of existing food resources and out-of-home attempts to expand food and food resources, especially through reliance on culturally non-normalized means of access?

This latter question concerns the difference between those survey research studies that operationalize hunger as food insufficiency and those that operationalize it as food insecurity. When hunger is measured by reports to interviewers about perceptions and behaviors that index food shortages, serious questions arise about what ought to indicate food insufficiency, what ought to indicate resource insufficiency, and what ought to indicate food insecurity. These measurement questions can best be addressed by considering alternative ways of measuring hunger.

I have a section on appetite reports and undernutrition as measures. I'll skip that in the interest of time. In the United States, policy scientists are moving toward the use of an alternative conceptual definition of hunger, namely, food insecurity. Hunger is understood as a condition of inadequate food, inadequate in amount or nutritional value, or perhaps lack of access to such food through culturally normalized channels. This definition works better in a social science context than appetite reports or undernutrition indicators, because food insecurity casts inadequate foodstuffs or their access into a socioeconomic context of limited resources.

It has another advantage. It posits dysfunction, i.e., malnutrition, as a potential consequence of hunger. The main drawback of equating food insecurity with hunger is that food insecurity is a broader concept than hunger. Equating the terms does not allow one to distinguish insufficient food stores from sufficient food stores, at least at the household level, that have been laid in or augmented into sufficiency through culturally nonnormalized channels. Said differently, households or individuals would be counted as food insecure if they possessed sufficient food but acquired it through nonnormal channels such as reliance on emergency food providers, friends or relatives, or means of access other than conventional ones. Conventional means of access have been defined elsewhere as purchasing food at standard food outlets, relying on federal food-assistance programs, or growing or hunting one's food supply.

At issue here, at least in part, is whether coping behaviors are to be counted as signs of hunger, or as signs of food insecurity short of hunger. Previous in-depth studies of families or individuals experiencing food shortages reveal a number of efforts such persons take to increase their food supplies that involve relying on emergency food providers such as food pantries and soup kitchens. Other coping behaviors are said to include tactics that stretch food or food money, for example, buying less expensive or less nutritious foods, or cutting the size of or skipping meals. Focus groups conducted by researchers with the Community Childhood Hunger Identification Project, or CCHIP, among low-income persons and food-assistance service providers have also turned up these efforts. In addition, the focus groups identified other means

of food-supply expansion. Specifically, low-income persons turn to support networks, friends and relatives, to seek loans for food money, borrow food itself, or send children to eat at the homes of those in their support networks. More rarely, some of the focus groups report relying on grocery store credit or diluting infants' formula when there are small children in the house.

Nearly all members of the focus group mentioned one key food-stretching item: buying and serving less expensive foods. It is important at this point to propose a distinction between coping behavior on the one hand and, on the other, perceptions and behaviors that indicate food insufficiency. The difference is this. Coping behaviors refer to strategies that respond to food shortages that are used by household members who go outside the household in an attempt to add to their food supply by acquiring meals or food money through culturally unconventional channels. Perceptions and behaviors that indicate food insufficiency refer to direct reports of perceived inadequate food intake or perceived household food shortages and to behaviors that involve handling food or food resources to make them last longer. This includes behaviors representing restricted food intake among household members.

Consider the implications of this distinction. Insufficiency of food and food money attributed to drained resources is here being defined as hunger. Hunger so defined is measured by self-reports of the experience, or the perception of it in other household members, by cutbacks or alterations in eating behavior due to food shortages, by perceptions of insufficient food money, and by relying on a limited number of emergency foods, and lack of dietary diversity. These behaviors that handle food shortages are not considered coping behaviors because they are located within the context of limited household food stores. They are in-the-home moves that do not result in acquisition of more food or food money.

Coping behaviors are here defined not as indicators of hunger per se, but are deemed responses to hunger. This is because they are located outside of the context of working with the available household food supply, being instead strategies played out in culturally nonnormalized arenas of acquisition to expand either the supply of food, food money, or number of meals that can be served.

In brief, intrahousehold handling of food shortages is being called food insufficiency.

This is being equated with hunger, whereas extrahousehold responses to hunger are being understood as attempts to cope with it. Taken together, food insufficiency and attempts to cope with it are here defined in the broader term, food insecurity. Food insecurity as so defined is comprehensible and measurable by social scientists using survey research methods. But to equate this with the definition of hunger does not lend itself well to the formation of governmental food-assistance policies designed to mitigate hunger, because food insecurity is overbroad in scope.

guaranteed income that persons could spend on groceries. The solution to hunger would be built into the definition of hunger, leaving policy formation untenable.

The more narrow definition used in the CCHIP study—perceived food or food resource insufficiency attributed to drained resources—has been chosen not simply because of its lack of contradiction to food policy aims, but because it seemed to reflect the direct experience of hunger as reported by respondents in the early days of hunger research. To reiterate, the definition focuses on inadequacy of food stores and food money at the household level and perceived inadequate food intake or alterations to eating behavior at the individual level.

I'm going to skip a discussion of the sample because Cheryl has presented that same new data set that I will be using today. We also ran an analysis looking at patterns of handling food resources in the home among hungry families. It represents very much that stage phenomenon that Jean-Pierre Habicht talked about earlier today, and also was shown in a box plot that Cheryl presented earlier. I'll be glad to talk about that later.

Let me move on to the coping behavior analysis. Recall that previous research has identified a number of strategies used by low-income people to expand their possession of food and food resources when food shortages occur. The first exhibit, Table 4, lists the items as they appear on the current CCHIP community questionnaire (see Exhibit 1). In Table 4, a term more inclusive than coping behaviors is used to refer to these behaviors, the term being hunger-adjustment strategy.

This term is used because different types of strategies have been included in the current CCHIP questionnaire, extrahousehold strategies defined earlier as responses to hunger, the coping ones as well as intrahousehold behaviors involved with handling shortages of food or food money. The extrahousehold hunger adjustment strategies in Table 4 are items 7 through 9: borrowing money for food or borrowing food itself and going to or sending children to the homes of others for meals; items 10 and 11, the food pantry and soup kitchen items; and items 12, 14, and 15, buying food on credit, getting discarded or leftover food, or some other way of getting food.

Intrahousehold hunger adjustment strategies in Table 4 are items 1 through 6: buying or serving less expensive food and less nutritious food, adults' eating something different from the children, not giving children or adults a balanced meal and diluting infant formula, and item 13, juggling bills to have more money for food.

To see results about these items, examine Table 5, which presents information on these strategies taken from all interviewees in the composite sample, and separately for each of the three CCHIP hunger status groups, those reporting no hunger, those at risk, and hungry families (see Exhibit 2). The percentage of households who have relied on a particular strategy is shown, as well as the mean number of times the strategy is used per month.

Exhibit 1

**Questionnaire Items Providing Database for Intrahousehold Indicators of Hunger
and Extrahousehold Responses to Hunger**

People do different things to stretch their food or food money when they are running short of money. Thinking about the past 12 months, please tell me how often you did each of the following things:

1. How often did you buy and serve less expensive foods?
2. How often did you buy and serve foods that were not as nutritious as you would like because you were trying to stretch your food money?
3. How often did you feed your child(ren) a meal but you ate something else to make sure they got the food they needed?
4. How often were you not able to give your child(ren) a balanced meal because you could not afford it?
5. How often did you (or other adult members of your household) not eat balanced meals because you could not afford to eat that way?
6. [IF CHILD UNDER 2] How often did you dilute your child(ren)'s formula or substitute Kool-Aid or sugar water?

People sometimes go to others to get enough food to go around when they are running short of money. Thinking about the past twelve months, please tell me how often you did each of the following things:

7. How often did you borrow money for food from friends or relatives?
8. How often did you get food from friends or relatives?
9. How often did you go or send the children to the homes of friends or relatives for meals?

People sometimes go to different places to get enough food to go around when they are running short of money. Thinking about the past 12 months, please tell me how often you did each of the following things:

10. How often did you get food from a food pantry?
11. How often did you get meals from a soup kitchen or church?

People do different things to have enough food to go around when they are running short of money. Thinking about the past 12 months, please tell me how often you did each of the following things:

12. How often did you buy food on credit?
13. How often did you choose not to pay bills on time so that you had money to buy food?
14. How often did you get food that was left-over or discarded by others such as stores, restaurants, schools or other people?
15. How often did you maybe get food some other way; what other way did you get food?

Exhibit 2

Extent and Frequency of Use of Extrahousehold Responses to Hunger and Intrahousehold Behaviors Indicating Hunger in the CCHIP Sites, 1992-93.

Hunger Adjustment Strategy	All interviewees (n=2202)		No hunger (n=573)		At risk of hunger (n=1200)		Hungry (n=427)	
	Ever use (%)	Mean use*	Ever use (%)	Mean use	Ever use (%)	Mean use	Ever use (%)	Mean use
Buying and serving less expensive food	90.9	3.46	74.1	2.39	96.0	3.71	98.8	4.21
Buying and serving less nutritious food	66.1	1.68	31.9	0.50	72.5	1.69	93.4	3.23
Adults eating differently than child(ren)	57.7	1.70	15.4	0.30	65.4	1.81	92.7	3.27
Not serving child(ren) balanced meal	45.4	0.98	5.8	0.08	47.2	0.78	93.4	2.74
Not serving adult(s) balanced meal	57.2	1.49	8.2	0.10	66.5	1.52	97.2	3.29
Diluting infant's formula	4.2	0.11	1.4	0.02	4.5	0.11	6.8	0.22
Borrowing money for food	48.2	0.62	16.4	0.16	55.5	0.65	70.5	1.16
Getting food from friends or relatives	51.1	0.72	23.0	0.31	56.9	0.75	72.8	1.19
Sending children to or eating at friends or relatives	20.1	0.36	5.1	0.07	21.1	0.35	37.7	0.77
Getting food from food pantry	26.5	0.21	11.7	0.08	27.6	0.21	43.3	0.38
Getting meals at soup kitchens	5.4	0.05	1.7	0.02	5.1	0.04	11.5	0.12
Buying food on credit	8.0	0.13	5.8	0.09	7.9	0.11	11.5	0.24
Not paying bills on time	67.3	0.98	36.9	0.35	74.0	1.05	89.9	1.64
Getting discarded or left-over food	10.8	0.16	4.7	0.07	10.3	0.15	20.4	0.30
Other means of getting food	40.9	0.93	39.0	1.11	42.9	0.90	38.0	0.77

* Number of times per month

Among the notable findings in the first pair of columns in Table 5, one can observe that, overall, 9 of 10 respondents stretched their food resources by buying and serving less expensive food. This particular action is hardly unique to low-income households, representing instead a common management strategy also used by middle-income families. Not so common among the middle class are the remaining strategies. Two-thirds of the respondents report buying and serving less nutritious food, with nearly three-fifths reporting that adults eat something different from what the children eat, and a like number reporting that adults are not eating balanced meals when food money is short.

Just under half of the households say that they are unable to serve the children a balanced meal when times are tight. Following down columns one and two, you can see that members of low-income households report relying on social support networks when money is short, nearly half turning to friends and relatives to borrow money for food and more than half borrowing food. One in four get groceries from a food pantry, and one in twenty get meals from a soup kitchen. More than two-thirds choose not to pay bills on time in order to have money for food, and more than 10 percent get discarded or leftover food. Moreover, looking at the last three pairs of columns in Table 5, it becomes apparent that the frequency of reliance on these methods varies directly with hunger status. For each strategy, except for the other-means-of-getting-food category, the frequency of reliance is highest for hungry households, next highest for households at risk of hunger, and lowest for households without hunger. This is so whether frequency of use is understood as percentage of households that have ever used a given strategy, or as the mean number of times a strategy is used in a given month. The significance of this finding will be discussed as the first key point in the conclusion.

Given the close association between these hunger adjustment strategies and the CCHIP hunger index, the question arises about whether all these behaviors are empirical markers of hunger, that is, behaviors indicating the presence of food insufficiency. To answer this question, a principal components factor analysis is conducted of the eight CCHIP hunger scale items that you heard Cheryl talk about earlier, the eight extrahousehold adjustment mechanisms or coping behaviors, and the seven other intrahousehold adjustment mechanisms that are not part of the CCHIP hunger scale. These are shown in Table 6 (see Exhibit 3).

Table 6 shows factor loadings retaining the five factors that have Eigenvalues greater than 1.0. The factor coefficients that appear in bold print are those that load onto the primary factor, each having a value of .55 or greater. Note that the only items that load are those representing intrahousehold behaviors and perceptions that could be said to point to food insufficiency. Seven of the eight CCHIP hunger scale items load, the exception being the item that has the smallest frequency, children going to bed hungry.

In addition, five of the seven other intrahousehold hunger adjustment mechanisms that are not part of the CCHIP scale load onto this factor. The two that do not load have extreme frequencies, buying and serving less expensive foods being over 90 percent, and diluting infant formula being under 5 percent.

Exhibit 3

Principal Components Factor Analysis: Unrotated Factor Pattern of CCHIP Hunger Scale Items, Other Intrahousehold Indicators of Hunger and Extrahousehold Responses to Hunger. CCHIP Sites, 1992-93. (n=2200)

<i>Item</i>	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>	<i>Factor 5</i>
(Eigenvalue)	(7.17344)	(1.69218)	(1.34121)	(1.24524)	(1.16020)
CCHIP Hunger Scale Items					
HH Ever Run Out of Money for Food	.65552	.12851	.08566	-.24302	-.00533
HH Ever Rely on "Emergency" Foods	.64461	.27209	-.17978	-.07043	.01289
Adults Ever Eat Less Than They Should	.75057	.03630	-.14112	-.25176	.05519
Adults Ever Cut Size or Skip Meals	.76971	.05942	-.15720	-.22883	.03208
Children Ever Report Hunger	.64662	-.50299	.02638	.08111	-.06495
Children Ever Eat Less Than Should	.66674	-.56552	-.01281	.02327	-.07772
Children Ever Go To Bed Hungry	.45865	-.47377	.14770	.19811	-.01902
Children Ever Cut Size or Skip Meals	.64333	-.55685	-.01879	.01491	-.09126
Other Items Indicating Adjustment to Hunger					
Buying/Serving Less Expensive Foods	.44140	.32809	-.24717	.32098	.18836
Buying/Serving Less Nutritious Foods	.66960	.16717	-.23623	.15452	.08450
Adults Eating Differently Than Children	.71831	.18482	-.14078	-.10025	.03971
Not Serving Children Balanced Meal	.77437	-.08217	-.14636	.10182	.05774
Not Serving Adults Balanced Meal	.81709	.15366	-.21193	-.03894	.08061
Diluting Infant's Formula	.14380	.06407	.24725	-.03831	.20342
Borrowing Money for Food	.52735	.21205	.39884	-.20547	-.25331
Getting Food from Friends/Relatives	.47040	.33598	.44615	.12134	-.27034
Sending Children/Eating with Others	.39301	.17913	.46059	.10131	-.33246
Getting Food from Food Pantry	.33793	.04446	.40286	-.06844	.51820
Getting Meals at Soup Kitchens	.18937	-.07487	.37066	.04702	.67191
Buying Food On Credit	.16274	-.02444	.06219	.49943	-.16583
Not Paying Bills On Time	.58227	.23590	-.07119	.05491	-.17560
Getting Discarded Food	.26198	.05037	.23742	.42103	.01072
Other Means of Getting Food	-.01843	.17005	-.18568	.60396	.12390
Proportion of Variance Explained	.3119	.0736	.0583	.0541	.0504
Total Proportion of Variance Explained = .5483					

Note that Table 6 has five factors. To see the separate factors more clearly, an orthogonal transformation has been performed, retaining these five factors, and these are displayed in Table 7 (see Exhibit 4). The rotated factor pattern exhibited in Table 7 shows that 10 items load onto Factor One, having values of .55 or greater. Included are the four CCHIP hunger items that pertain to the household as a whole or to adults in the household, and the intrahousehold adjustment strategies of buying and serving less expensive foods, less nutritious foods, adults eating differently than children, adults not serving children or themselves balanced meals, and juggling bills. This factor would seem to subsume an underlying dimension of household adult hunger experiences.

Next, four items load onto Factor Two, all of which are CCHIP hunger scale items pertaining to children. The childhood hunger factor emerges clearly here. Factor Three involves a dimension of reliance on friends and relatives for food and food money with three such items loading. Factor Four has two items that load on it, both of which refer to reliance on emergency food providers. The fifth factor taps a separate other-means-of- getting-food dimension.

These five factors designate distinct and intuitively understandable categories of behavior that figure into the measure of food insufficiency and responses to it. Evidently, there is an adult/household dimension of hunger that encompasses perceptions of household food and food-resource shortages, behaviors that handle these shortfalls, and reductions in food intake primarily among adults. There is a child-hunger dimension that subsumes direct reports of hunger among children as well as perceived cutbacks in children's food intake. There is a dimension that taps reliance on a social support network outside the household, friends, and extended family, to provide expansion of food or food money. There is a dimension that intimates the use of emergency food providers, again outside the household, in which expansion of the food or meal supply is sought. Finally, there is a dimension that points to other means of getting food.

It is clear that the specific indicators of intrahousehold food insufficiency, the eight hunger scale items used by CCHIP, and six of the other intrahousehold measures of food insufficiency are not synonymous with extrahousehold strategies relied on to respond to food insufficiency. The importance of this finding will be discussed as the second key point of the conclusion, to which I now turn.

In summary, two main conclusions can be drawn from these data. First, the strong association between the CCHIP food insufficiency scale and the extrahousehold responses to food insufficiency shows that the out-of-home strategies used to expand food and food resources are not completely effective. It seems evident that neither the intrahousehold moves to handle food shortages nor the extrahousehold strategies that seek to expand food or food money should be understood as successful coping mechanisms. Focus groups, pretests, and pilot studies early in the CCHIP project, as well as early work in projects by others, led hunger researchers to believe that reliance on emergency food providers and on informal networks of support was a coping device. However, coping is defined as successful adjustment to a problem, an adjustment that solves the problem.

Exhibit 4

Principal Components Factor Analysis: Rotated Factor Pattern of CCHIP Hunger Scale Items, Other Intrahousehold Indicators of Hunger and Extrahousehold Responses to Hunger. CCHIP Sites, 1992-93. (n=2200)

<i>Item</i>	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>	<i>Factor 5</i>
CCHIP Hunger Scale Items					
HH Ever Run Out of Money for Food	.56442	.19148	.31147	.17600	-.17153
HH Ever Rely on "Emergency" Foods	.70283	.06339	.16097	.03940	.03928
0Adults Ever Eat Less Than They Should	.71371	.29265	.12050	.11516	-.16793
Adults Ever Cut Size or Skip Meals	.73846	.28679	.13594	.09075	-.14074
Children Ever Report Hunger	.28454	.76549	.09949	.06340	.04192
Children Ever Eat Less Than Should	.30237	.82079	.06504	.03563	-.02152
Children Ever Go To Bed Hungry	.07927	.66437	.10878	.12948	.14135
Children Ever Cut Size or Skip Meals	.28989	.80220	.06363	.01760	-.03068
Other Items Indicating Adjustment to Hunger					
Buying/Serving Less Expensive Foods	.54899	-.06522	-.02688	.09369	.43236
Buying/Serving Less Nutritious Foods	.67850	.17833	.05798	.05931	.25315
Adults Eating Differently Than Children	.71789	.16985	.16833	.09499	.00089
Not Serving Children Balanced Meal	.63167	.44549	.08793	.10167	.16119
Not Serving Adults Balanced Meal	.80979	.24212	.11814	.10376	.07130
Diluting Infant's Formula	.05444	.00362	.12534	.33128	-.01831
Borrowing Money for Food	.32220	.11385	.65364	.12493	-.16999
Getting Food from Friends/Relatives	.24747	.02355	.72074	.11741	.16113
Sending Children/Eating with Others	.11740	.12535	.68977	.05728	.10454
Getting Food from Food Pantry	.16835	.08410	.11413	.70898	-.02423
Getting Meals at Soup Kitchens	.01836	.10476	-.07872	.78105	.07061
Buying Food On Credit	-.00973	.18349	.18403	-.09066	.48170
Not Paying Bills On Time	.55052	.10882	.31083	-.07098	.13051
Getting Discarded Food	.04984	.14977	.26304	.17272	.42541
Other Means of Getting Food	.04686	-.11192	-.14375	-.02425	.63865
Variance Explained	4.980177	3.002894	1.917795	1.417589	1.293816

It is apparent from these data that such behaviors do not solve the problem of food insufficiency, despite what are unmistakably proactive moves to rectify food shortages by families in financial crisis.

One piece of evidence makes it plain that such moves do not entirely succeed. The number of strategies used is greater for hungry families than for those at risk which, in turn, is greater than for the nonhungry. If the strategies worked, if they successfully adjusted to insufficient food, if they fully coped with it, they would have either prevented hunger or, more likely, there would at least be an association between hunger status and the several hunger adjustments that was weaker. Rather, these strategies, escalating in prevalence and occurrence as they do with each higher level of food insufficiency, would seem to represent greater and greater need.

They are signs of need because families in the United States tend not to turn readily to others for help. Use of emergency food providers is stigmatizing and requests for help from friends and extended family members usually necessitate an implicit admission of failure. A careful look at the mean number of times per month such strategies are used, shown in Table 5, makes it clear that even hungry families do not turn often to these supports. They rely on friends and family a little more than once a month for food and food money and their frequency of using emergency food providers averages even less.

Of course, help is limited to hungry families not simply because they might be too embarrassed to ask for it too often, but also because these sources of assistance are themselves quite limited enterprises. Food pantries of necessity often have rules that limit the family to one visit per month, for example. Moreover, friends and members of low-income hungry families are also likely to be struggling financially, diminishing the amount of support available.

The second main conclusion drawn from the factor analysis is that intrahousehold behaviors and perceptions that arguably indicate food insufficiency are not synonymous with extrahousehold responses to food insufficiency. Acquisition of food from nonnormal media is unquestionably and strongly associated with hunger, but even though these extrahousehold food expansion behaviors cohere with intrahousehold food insufficiency items, they do not inhere to the concept of food insufficiency. Put another way, food insecurity occupies a conceptually broader space than food insufficiency.

Support for that contention is this: separate dimensions emerge when factor analysis appears to distinguish adult household experiences of hunger, child experiences of hunger, reliance on friends and family in response to hunger, reliance on emergency food providers in response to hunger, and other means of getting food. That these underlying dimensions emerge separately in a rotated factor analysis supports the notion that food insufficiency, although related, differs from the broader concept of food insecurity. This seems to be an important conceptual discrimination and deserves further scrutiny.

In conclusion, when developing a measure to be used to identify hungry households for a general population survey, it is evidently better to employ a multidimensional and therefore multi-item measure, preferably a scale. But the scales should be able to distinguish food insufficiency from food insecurity, the latter being broader than the former. Perhaps items could be formed into a broad food-insecurity scale that could subsume food-insufficiency items and be used as a screening tool that would identify risk of hunger, whereas the food-insufficiency subscale itself could be used to classify hungry households.

Thank you.

MARGARET ANDREWS: Thank you, Rick. We have passed our ending time, as you're probably all aware. I can take a few burning questions now but we want to remind you that there will be general discussion this afternoon, where we can bring up points. We plan on reconvening right at 1:30.

(The meeting adjourned for lunch at 12:13 p.m., to reconvene at 1:30 p.m.)

Session III: Technical Considerations

Chairperson: Bruce Klein

Measuring Hunger: Issues for the Future

John Cook

Measuring Irregular or Periodic Hunger as an Element of Food Insecurity

Valerie Tarasuk

The Use of Scaling and Indexing To Measure the Severity of Food Insecurity

Edward Frongillo, Jr.

(The afternoon session opened at 1:30 p.m.)

BRUCE KLEIN: Welcome back from lunch. It is quite balmy outside. I hope everyone enjoyed that nice respite of sunny warm weather after the bitterly cold and harsh weather that we have been having lately.

I am in the Office of Analysis and Evaluation of the Food and Nutrition Service. I served as the captain of the program organizing committee, and I'm very happy to be here today. It is a great relief, a great honor, and a great pleasure. I would like to thank KRA Corporation for the great job they did in making the arrangements for us for today's conference.

As an economist who has been involved in poverty-related research for many years, I find the topic of food security very important. This is because it is both the basis for poverty measures, or can be, and it is also a consequence of being poor. So that is my thread that I hold onto in this work. Not being a contributor to the literature, I feel like an outsider, but one who appreciates the importance of the work that we are talking about today.

Our first speaker on the program this afternoon is Dr. John Cook. He is going to present a paper that he prepared with Dr. Larry Brown. The title is "Measuring Hunger as an Element of Food Security: Issues for the Future." John Cook is a research director at the Center on Hunger, Poverty, and Nutrition Policy at Tufts University. Let me briefly refer to his biography. Dr. Cook has degrees in mathematics, in educational psychology, and in city and regional planning, so he brings a very varied background to this work. So without further ado, I would like to present John Cook.

JOHN COOK: Thank you, Bruce. I am currently employed as the research director of the Center on Hunger, Poverty and Nutrition Policy at Tufts University in the School of Nutrition. The Center on Hunger was established in 1990 by then-Tufts President Jean Mayer, with whom I think many of you are familiar, and its current director, Dr. Larry Brown. Larry and I coauthored the paper that I am going to summarize here today. I want to point out that there are 20 or more copies here on the front row for those of you who are interested.

I want to thank Bruce and commend him and the other people in FNS and NCHS and other agencies responsible for convening this truly extraordinary working conference on measuring hunger and food insecurity. This is a really unique and, I believe, momentous opportunity for us to be part of Government working at its best. I sincerely hope that we prove equal to the task that we have been given, and I believe that we will.

A central purpose for our center is to make scientific knowledge and technical skills of use in the policy arena, especially to address compelling social and health problems. I think the reason that we are here today is that domestic hunger is such a problem

developed at the Harvard School of Public Health and extended and modified later at Tufts, as well as some FAO and WHO indirect measurement procedures. We also look in some detail at direct measures of hunger, notably those developed and reviewed here earlier within the context of the Childhood Hunger Identification Project, or CCHIP, and later modified, refined, and tested by Radimer and her colleagues at Cornell, and by Briefel and Wotecki and their coworkers at the National Center for Health Statistics.

In addition, in our paper we review the food sufficiency item from the USDA Nationwide Food Consumption Survey, which also has been discussed here, and the elderly hunger scales developed by Martha Burt and her colleagues at the Urban Institute.

I also want to note that there have been a large number of additional hunger and food-insecurity studies conducted at the State and local levels by a variety of agencies over the past decade, and several of these are reviewed by Marion Nestle in her 1992 *Journal of Nutrition* article. The details of the technical and perceptual issues pertaining to each of the approaches we reviewed are covered in our paper, which is available here, as I said, and I'm not really going to get into much detail on those.

Our approach in the paper has not been to argue the merits of one of these approaches over the other, but rather to synthesize what we think is the best of all the approaches and put that in the context of developing an annually reportable baseline hunger measure. With this in mind, I want to turn now to the part of our paper that I will summarize and that contains our recommended synthesis.

Over the last decade or so, there has been major progress in clarifying and operationalizing the definitions of hunger, undernutrition, and food insecurity. Nancy Leidenfrost, who is here today from the USDA Extension Service, did a commendable job of collecting, organizing, and summarizing a very large number of definitions of these concepts in her February 1993 monograph.

Anyone reading Nancy's monograph can't help but be struck by the tremendous degree of similarity among many of the definitions of food insecurity and hunger. In many cases, they are essentially indistinguishable. Refinement of the use of the term food security has allowed researchers to move beyond a narrow focus on physiological and psychological sensations associated with hunger, and which are often so easily trivialized.

The term food security has also led to clarification of the nature of hunger as a social problem that can affect communities, States, and even nations in addition to households and individuals. In many instances, the terms "hunger" and "food insecurity" appear in the literature synonymously. Hunger remains the most salient concept within public awareness and among politicians and policy makers, however, and most effectively communicates the true nature of the problem about which we are all concerned.

Hunger has a human face and it calls to mind human suffering and need. Food security, although it is a valuable concept that we clearly don't want to discard, and that is very useful for researchers in an academic context for improving our understanding of the social problems that we're dealing with, lacks this essential humanness. We have concluded from our review, and from other work at our center, that the term hunger is more effective than the term food security within the policy realm and in terms of bringing about the kinds of changes that we feel are very important to have happen. Therefore, we strongly recommend that hunger language be included prominently in this project. We encourage all the participants here to view the activity we are engaged in as the creation of annually updated baseline hunger measures against which we can gauge trends in the problem of hunger in America.

Poverty is defined in the United States in terms of the ability to purchase a nutritious diet. Moreover, poverty is the principal proximate cause of hunger in the United States. There is a long history of strong association of poverty and hunger within public awareness and in federal policy. We recommend that the hunger-measure supplement preserve this important relationship by including economic risk factors among the questions in the supplement. This has to be done, however, while carefully protecting the independence of the hunger-measure scale from income and poverty status, so that statistical estimation of the relationships between hunger and poverty can be accomplished.

We conclude from our review of the studies that have been done, efforts that have been undertaken to measure hunger, that effective hunger-measure scales will contain only two categories: hungry or not hungry. This minimum number of categories will facilitate clear determination of status and will enhance the statistical usefulness of the resultant data, as well as the usefulness of the data in the policy arena. Moreover, to avoid arbitrariness in setting cutoff values, we feel it is important to follow the recommendations put forth by Radimer in the history of that work by using any score above the minimum value to indicate hunger. But we believe these objectives can be met while still creating an indicator of the severity of hunger through some kind of summative or other process, which was discussed earlier.

It is also important that the hunger-measure scale be capable of identifying spells of hunger that occur periodically, either at regular or irregular intervals. This periodicity of hunger problems is characteristic of many high-risk groups and should be included in some way in the scales. It is also critically important that the data arising from the food-insecurity supplement enable analysts and researchers to estimate the prevalence of hunger among standard subpopulations, for example, by race, age, and sex.

This suggests consideration of separate subscales for children, adults, and the elderly. There has been a clear precedent discussed today for inclusion of those kinds of subscales.

Finally, we believe it is desirable that the data resulting from the hunger-measure supplement be consistent with data from other CPS supplements to the degree possible, especially the March income supplement. The ability to produce reliable estimates of the relationships among hunger and poverty depends on this consistency. It may therefore be desirable to at least

include some questions addressing the occurrence of hunger problems over several time periods, 1 month, 6 months or, if possible, even a year.

In summary, in a perfect world, I believe we would leave this conference tomorrow with effective scales for measuring both hunger and food insecurity. And we might find, after a year or so, that the prevalence of hunger within the United States population is somewhat lower than the prevalence of food insecurity. If we have to accomplish only one of these goals, however, and create only one type of scale, although I sincerely hope we're not constrained to that, I urgently recommend that we bring our considerable talent and ability to bear on the problem of creating hunger-measurement scales that will enable us to develop annually updated baseline hunger measures.

If we rely solely on food security and food-security language as defined by the Life Sciences Research Office in the broader definitions, we will seriously limit the effectiveness of the measures and resultant data and estimates for politicians, policy makers, and other leaders who are genuinely, seriously concerned about the growing problem of hunger in America. Habicht and Meyers, in their review article, emphasize this risk and offer compelling admonitions that we avoid it and that we instead create hunger measures that are effective for the policy arena.

If we fail to create measures here that enable us to produce reliable estimates of hunger prevalence, we will have missed a unique opportunity, and one that I fear will not reappear in the foreseeable future. We must not let our responsibilities and interests as academicians and researchers, which are very real and important, lead us to sanitize and dehumanize the very human problem that we are here to address, the problem of hunger.

The very impressive work done already by our colleagues Cheryl Wehler, Kathy Radimer, Christine Olson, Ronette Briefel, Catherine Woteki, Martha Burt, and many others provides ample materials for creation of effective hunger-measurement scales. Now, we simply need to do it.

Thank you.

BRUCE KLEIN: Thank you John. Our next presentation will be by Valerie Tarasuk. Valerie is currently a postdoctoral fellow in social epidemiology at the department of preventive medicine and biostatistics at the University of Toronto. Dr. Tarasuk's research takes place at the Ontario Workers Compensation Institute, where she works with a team of researchers. In 1991, Dr. Tarsuk completed her Ph.D. work in nutritional sciences at the University of Toronto under the supervision of Professor George Beaton. I would like you to welcome Valerie Tarasuk.

VALERIE TARASUK: I think I must have the distinction of being the only person who went out today and changed money.

Hunger is a problem in Canada as well as in the United States, so the thinking I have done about it comes from that perspective, although the issues, from what I can tell so far today, are more or less universal and certainly the measurement challenges are the same.

To reiterate some of the ideas that have already come across that are important, we can think of hunger and food security as two ends of a continuum. At one end, this notion of abundance and ample, personally acceptable nutritious, safe food; at the other end, no food at all.

That said, however, I think we would also agree that not all hunger is an element of food insecurity. If hunger is thought of in terms of the very narrow physiological definition that was presented by the Life Sciences Research Office, as an uneasy and painful sensation caused by a lack of food, then it is commonplace and it is not necessarily linked to food insecurity.

The point I want to make here is that it is useless to take hunger out of its context. As we understand it and as people have talked about it today and as we want to study it, it is absolutely essential that hunger be considered within the social and material environment from which it arises.

The next question for me, then, in terms of a measurement of hunger is, what for? For me, the purpose of doing research on hunger is to identify policy and program gaps that we can fill, that will enable us to prevent it. That said, I want to talk about two particular measurement issues: one, the conceptualization of hunger itself, and two, the issue that Dr. Cook alluded to, the issue of periodic versus irregular hunger and what those distinctions are all about, and why it is important to look at them.

First, the conceptualization of hunger itself as a construct. The LSRO version is very narrow, a physical sensation of food deprivation. But throughout this day, the word has been used in much broader terms, as some element of food insecurity, but it is much broader. Dr. Cook made a very good point about the need to keep with the language of hunger because it is a powerful word, it has emotive appeal, and therefore hopefully it has some impact in the social and political system.

However, when it comes to measuring and doing statistical work, we need something better. The kinds of instruments or the kinds of scales that have been used to date range from asking people if they have enough food to asking about skipping meals or cutting the amount of food eaten, to actual food deprivation over some time-referenced period. The latter I think we would agree is likely to result in the physical sensation of hunger. Cutting food, not having enough food, skipping meals—I don't know.

Then layered on top of that are the comments from Christine Olson this morning about asking people who experience hunger about that experience and listening to their language. As she so eloquently demonstrated, they have different understandings and different uses of that term as well. From a measurement perspective then, it is important that we be clear, that we have a term that is very powerful that needs to be used in a public way, but when it comes to actually doing instruments and statistical analysis, we need something more precise.

Now to turn to the notion of periodic and irregular hunger—and again, I want to emphasize that I think it is essential that we understand the context in which hunger arises. It

is important to think about the context of periodic hunger versus irregular hunger, because the circumstances underpinning those experiences are different and perhaps have different solutions and different health and social consequences.

Let me first address the issue of periodic hunger. Periodic hunger is hunger that follows some predictable temporal pattern. It has a regularity about it. That means it has a known frequency. It arises in a context of severe and chronic poverty, where people are attempting to survive on income and other sorts of assistance which are fundamentally inadequate to meet their needs. So, in that context hunger is inevitable. It happens with a predictable frequency. It is an in-built part of the inadequacy of a person's situation or resources.

There is a set of resources that could characterize that setting. Those resources routinely are exhausted before they are replenished. The individual or the household's coping strategies are insufficient to compensate for that inadequacy, so there is a period of food deprivation.

The challenge of studying periodic hunger is twofold. First, we must characterize an experience of hunger, because if we know that the hunger has happened we have some understanding that satisfies us in a technical sense. Then we layer onto that another set of questions. We say, is this typical, is this a usual occurrence for you. And people who are enduring periodic hunger will be able to say "yes," and the periodicity will be quite describable.

The other important piece about studying periodic hunger is to very carefully examine the resource bases of people who are experiencing it, because the periodicity is not about intake behavior so much as it is about resource fluctuation. It is regular, and that regularity enables an understanding of the regularity of the patterns of hunger.

The second kind of hunger, irregular hunger, is that which does not follow a defined temporal pattern. Irregular hunger arises in situations where exceptional circumstances impede individuals' access to food, so their usual patterns of food sufficiency are somehow interrupted. I would like to paint two scenarios where that can arise. The first is at a moment of crisis where a household that has been managing, at least insofar as they have been avoiding acute food deprivation, somehow encounters an unanticipated and unavoidable change in revenue, or change in expenditure, so that the economic balance within the household tips. That balance is most likely to tip in households where there are insufficient financial reserves, that is, in low-income households. Our resilience to financial stress is about our savings, our financial holdings, and our resources. So, in households where those things are nonexistent or minimal, it takes very little sometimes to tip that balance. When the balance tips, hunger emerges when other coping strategies have become exhausted.

That is one scenario of irregular hunger. The other one that is important to think about is that of people whose lives are in a state of constant crisis. The example I have in mind concerns homeless people, people who depend on charitable food assistance programs and handouts and foraging for their food.

At any point along the way, something can interrupt access to food in that situation. They are particularly vulnerable to hunger because they have no financial or food reserves. They are working literally on a hand-to-mouth arrangement. So anything that interrupts that process is sufficient to precipitate an experience of hunger. The hunger is irregular in the sense that it doesn't follow a defined temporal pattern, as does periodic hunger, which is dictated by the temporal pattern of the resource acquisition. In the case of homeless people, however, there may be other patterns that would be quite definable but not perhaps temporal.

The measurement challenges here are twofold. I am not advocating studies of hunger among homeless people. If we know they are homeless, we know they are hungry, and this includes all homeless people. They are extremely vulnerable to hunger, and I don't see any point in trying to detail that. So I would propose that in that situation, a better use of resources is to document the prevalence of homelessness and to monitor that and to come to understand its social and material context.

Setting homeless people aside, then, and going back to the other sort of irregular hunger—I described it as an interruption or something that impeded regular access to food. That means there are complex precipitating events, such as unemployment or unanticipated and unmanageable medical expense. There could be other more minor sorts of events. It might be useful to catalog those precipitating events because they do speak to interventions of sorts.

I would like to conclude by saying that I think the predictability of irregular and periodic hunger can be best derived from a knowledge of the precipitating factors and their temporal patterns. It is essential that the measurement of hunger be very much wed to the examination of social and material circumstances—that its temporal patterns are absolutely tied to those temporal and material circumstances. I think to examine hunger in isolation, to take it out of this context, is to risk badly misunderstanding the problem and misrepresenting it.

Furthermore, I think the potential for useful program and policy initiatives to be generated from research on hunger also hinges on a careful and critical appraisal of contextual factors. The research challenge is to figure out how we can better measure and characterize social and material conditions and how we can improve linking these to other indicators of hunger and food security.

Thank you.

BRUCE KLEIN: Thank you, Valerie. Our next speaker is Edward Frongillo, Jr. Edward Frongillo is Senior Research Associate and Director of Computing and Statistical Consulting in the Division of Nutritional Sciences and the College of Human Ecology at Cornell. Since 1984, Dr. Frongillo has also worked with the New York State Nutrition Surveillance Program. His topic today is the use of scaling and indexing to measure the severity of food insecurity.

EDWARD FRONGILLO, Jr.: This conference is about the measurement of food security. The measurement of food security requires an understanding of what is measurement, how to construct good measures, how to validate measures, and also how to interpret them.

Simply put, measurement assigns numbers to observed phenomena according to certain rules. For measurements to be valid, they must reflect the theoretical structure of the phenomenon that they purport to represent.

I would like to emphasize that our interest is in measures and not in indicators. Let me give you a simple example of this. If we take body weight, if you're an anthropologist, body weight is a direct measure of body size; they are closely linked together. If you're a nutritionist or a health professional, you might measure body weight, using that as an indicator of something else, nutritional status or mortality or morbidity, where they are not so tightly linked. I think it is an important distinction we should keep in mind.

Construction of a measure proceeds through a series of steps. The way I have diagrammed it here is in terms of nine steps. The first of them is to clarify the purpose of the measure. The second and third ones are closely tied together and are iterative and belong together, which is to do basic research to help us understand the phenomenon that we're trying to measure and to develop a grounded theory or conceptual model of that phenomenon.

Then from that we would develop items, collect data on those items, examine how the data we have collected fit with the grounded theory we have developed, use the data to develop a measurement scale, assess the validity of it, and finally, use both those and other data to provide means for interpretation. Here, I'm going to focus in particular on interpretation that has to do with estimating prevalence.

What I would like to do is go through this list and make a few comments about some of the things that are listed here. In terms of clarifying purpose, there seems to be agreement at this conference that our purpose has to do with measurement of food security for individuals and households, although as Mark Winne in particular talked about earlier today, one could be interested in measuring food security at the level of communities or nations or some other larger grouping.

With the statement of purpose that we have, restricted to individuals and households, we still have questions about the individuals in which we're interested. Much of the research that has been done to this point is focused on women and children, but we could also be interested in the elderly or other adults. In terms of households, are we interested in measuring the food security of households from all income strata, or of a restricted set of people in terms of income strata? We have to think about whether or not the measures we develop are going to be applicable and work well for various ethnic groups and for various geographic regions of the country.

Also related to our purpose is the fact that, if we think about the individual level in particular, we can think of food usage occurring through a process that involves availability, accessibility, the acquisition of food, storage and preparation of food, and in the end, its consumption. The Life Sciences Research Office definition focuses on the first two of these, availability and accessibility, but we might think more broadly than that and include all of these, in particular, for example, if we're interested in the elderly. Some work that a number of people have done would indicate that perhaps it is preparation and the inability to prepare food that might be a source of insecurity for the elderly in particular. So, this is something we're going to have to clarify as we develop comprehensive food security measures.

The basic research that has been done up until now is based on the work that Kathy Radimer did, on the work that Cheryl Wehler did, and also on other work that a lot of people have done, both domestically and internationally. If you go through all of that work, I think there is a reasonable consensus from the literature that there seem to be four components of food security: the quality, quantity, and acceptability of food, and something having to do with the certainty, or absence of anxiety, in obtaining food. This is, I think, the best summary we have of the basic components of what food security in a broad sense is about. So, all these components have to be incorporated into any comprehensive measure that we develop.

The next step that I outlined was to develop items. If we look at the draft questionnaire that was circulated, there are five different types of items there. One of the challenges we will have, I think, is how to combine information from all of those items together. It is at this stage in the specification and development of items that we encounter the need to address face validity, which has to do with whether items measure the way we intend them to, and content validity, which has to do with whether the items together tell us about the domain or the breadth of the phenomenon that we are trying to capture.

If we can ensure this step, which I think is something that we will discuss at length in the workshop tomorrow, we would then take those items and go out and collect data from them. When we bring the data back, the sixth thing we would do would be to examine how the data we have would fit with the theory that we have brought to bear. Here, some techniques like factor analysis and some other techniques might be useful in helping us see how the data fit the theory that we have.

Then, we would develop a measure. This is where the idea of scaling would come in as a technique for putting items together into one coherent whole. We might consider a simple summative scale or perhaps something based on factor analysis. Another type of scaling that has sometimes been used is the Guttman scale, although that has some restrictive assumptions that are often untenable.

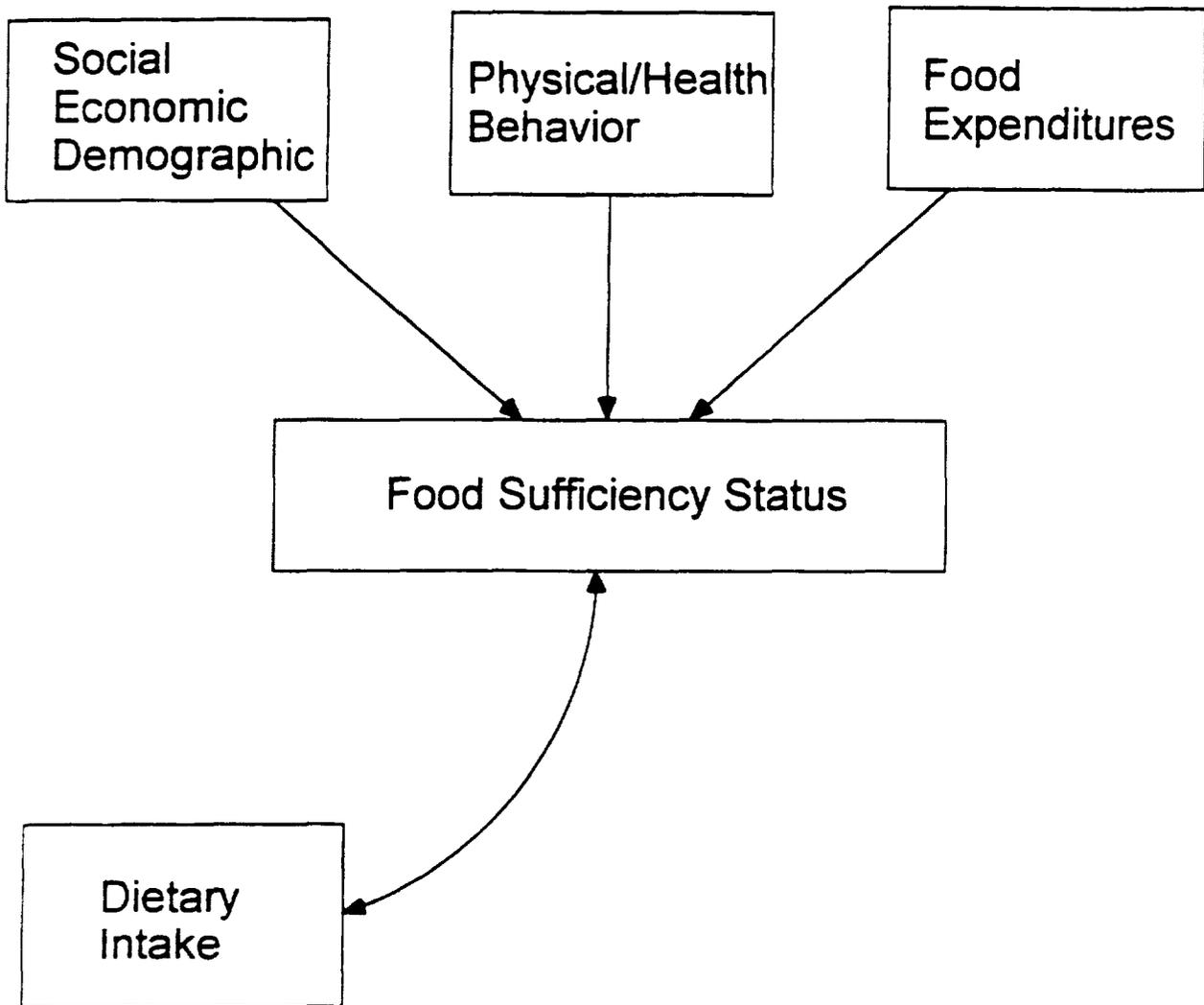
The next step then would be to assess the validity of the measure that we have developed. What I have put up here is that we can think of validity as having three parts, as being composed of, first of all, precision, which is the degree to which repeated measures yield the same value, and dependability, which is whether differences in the measure consistently reflect differences in

the phenomenon. If we go back to the example of body weight and body size, if we measure the body weight of a child, that body weight is influenced by things such as hydration, whether or not the child has been ill, and whether the child has just eaten, all of which are real in terms of how they affect body weight but aren't part of the phenomenon we're trying to capture, which is body size. Accuracy is whether or not a measure provides an unbiased estimate of the phenomenon.

How we achieve validity for each one of these is, first of all, precision. We achieve precision through two means: through redundancy, either by having repeated measures of something, or by having items which try to get at the same underlying aspects of the phenomenon, and by careful measuring, the measuring process itself. Dependability is achieved by understanding and avoiding the threats to it, actions that go back to an understanding of the basic phenomenon. Accuracy can only be achieved through construction, which rests in a very fundamental way upon the depth of understanding of the phenomenon that we're interested in.

How we assess validity is, for precision, either test-retest or in the kind of instrumentation we would try to develop here for some kind of reliability score like a Crombach's alpha. Dependability would be assessed by test-retest or perhaps by surveying threats to it. To take our example, we might ask the caretaker whether or not the child has been ill recently or whether or not the child has just eaten. If those things haven't happened, then we know that those threats

Exhibit 1



Cristofar and Basiotis (1992)

The problem with this is that, if we see associations, it tends to make us feel good, but we're never quite sure how good we ought to feel when we see a particular number that measures an association. We really don't have a standard for accuracy when we try to go about it in this way.

The ninth thing that I listed had to do with interpretation. In this case, in particular, how do we estimate if we think it is important to be able to express our measure in terms of prevalence? How do we convert from our measure to an estimate of prevalence? There are two basic ways. One is a method involving partitioning, where we have a cutoff, and we divide people in terms of—we have the measurement scale, and we say some people above a value are in one group and people below that value are in another group, or we can have more than two groups if we want. Then, down at the bottom are some methods of doing this that are based on probability.

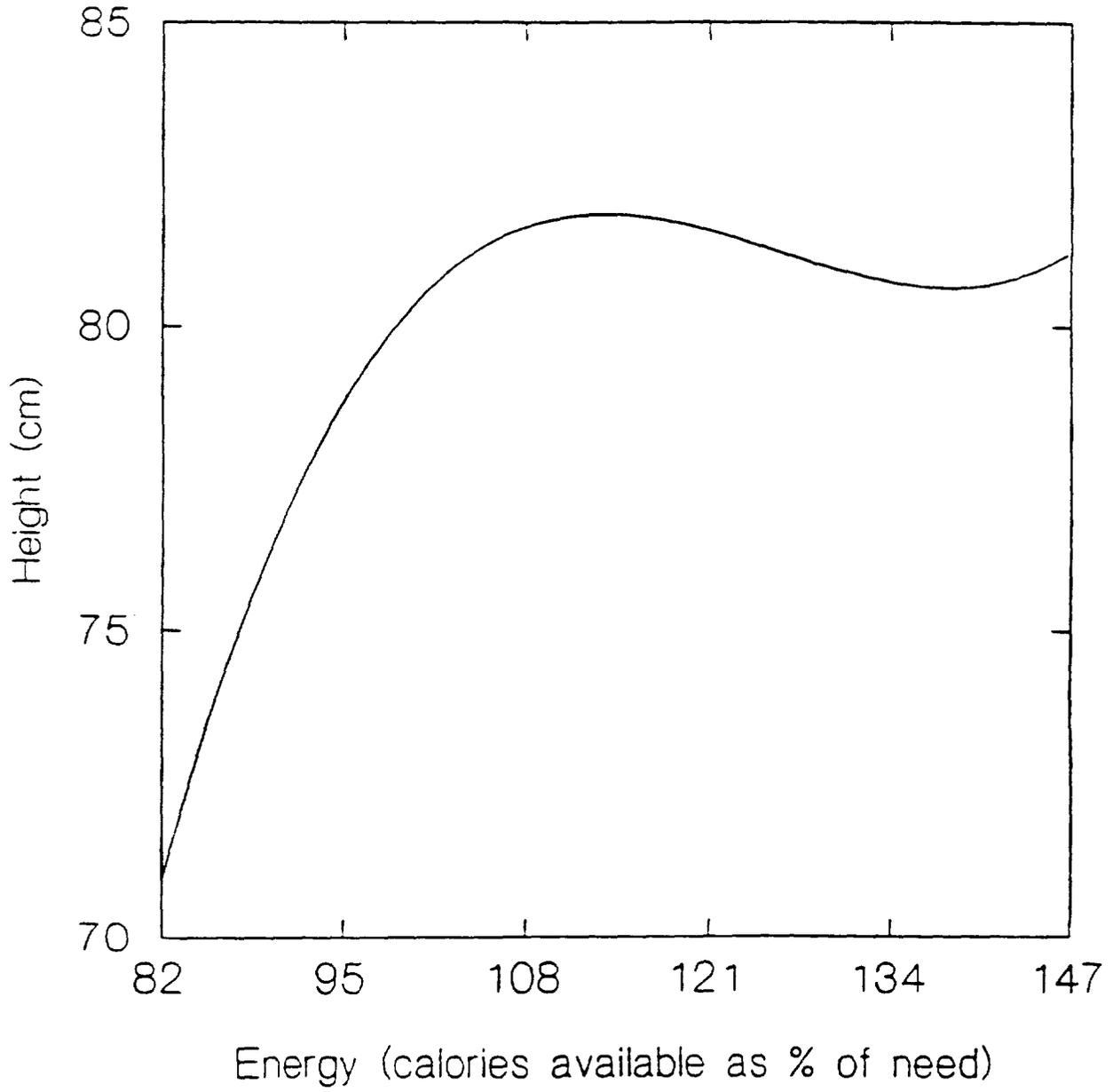
Among the partitioning methods are to simply base the partitioning on the grounded theory, what we know about the phenomenon from the basic research that we have done. As John Cook alluded to, this is the rationale that Radimer took in her work. Some other ways of doing this might be to relate it to other, better measures, if we should be so lucky as to have those, or to determine consequences by using some methods that involve assumptions about the distribution, where we use a graphical method or a more statistical method based on some kind of estimation, assuming a parametric distribution. There are some methods that are more arbitrary, such as clustering techniques or quantiles, where we simply divide the population on a basis of how many are equally spaced.

The probability methods are probably better if they can be done. They don't involve having a particular cutoff. These could easily be done through graphical analysis or an estimation procedure. Let me give you some examples of what I'm talking about here.

This graph comes from some work I recently finished looking at in cross-national variability and growth patterns throughout the world (see Exhibit 2). The graph shows on the ordinate height and on the abscissa is a measure of national food security, which in this case is energy, a comparison of calories available compared to need. This is the relationship you see when controlling for a lot of other factors. You can see it is a very nice relationship, in that it is flat up at the higher end of national food security, but at the lower end, you can see that the curve dips down.

What we might do is base a cutoff on something like this relationship, where we say somewhere near 100 percent is substantive grounds where what is available is less than the need, and that is also the place where the curve starts coming down very rapidly, so we might choose a cutoff on the basis of a relationship like this. So, this is a case where food security might be related to a known consequence.

Exhibit 2



This is an example from Daigh Tufts master's thesis (see Exhibit 3). Linda Meyers has done some work like this as well, where there is an interest in trying to understand the hemoglobin distribution in terms of anemia. In this case, because it was at high altitude, there was a group of polycythemics, which is very high hemoglobins. The idea here is that if we're able to assume that at least a middle population has a Gaussian or normal distribution, or is some known shape of distribution, then we can use that fact as a way of estimating prevalence to determine how many anemics are on the left side and how many are on the right side.

The way this might be done in terms of a graphical technique would be to use—this is a probability plot, so the left side, the left axis, is meant to represent the normal distribution (see Exhibit 4). The middle part of the line you see is a straight line, and that is where it is normal. The curves that are at the lower left and the upper right show where the actual observed distribution deviates from the straight line, so that is where it deviates from normality, and we can use the magnitude of that deviation to estimate the prevalence.

The problem we have in terms of food security is that it is highly unlikely, unless we were to measure an enormous number of items, that we would see a parametric distribution that is anything like what statisticians know about (see Exhibit 5). This is, for example, a distribution from the recent work of the Radimer children's score, and you can see it doesn't look anything like a normal distribution and it doesn't look like any known statistical distribution and believe me, I tried hard to find one.

So, if this is what the distribution looks like, then what do you do? If you do cluster analysis in this case, it tells that the cut point goes between six and seven. That makes no sense whatsoever, and cluster analysis is just a completely arbitrary technique here.

So, I think because we're going to have measures that have these kinds of distributions, it is going to be a particular challenge for us, unless we're able to justify, based on the strength of the research that we have done, where the cut points should be.

I would like to emphasize, because of its importance in interpretation of prevalence estimates, that we really do have to make sure that we can ensure the accuracy of this way of using the information. This is especially important because the accuracy is likely to depend upon the prevalence itself, and also it is likely to depend upon the overall validity of the underlying measure from which we're deriving.

I think four challenges confront us in developing a measure of food security. First, we need to ensure that the proposed measure rests upon a solid research base. Second, we have to be sure that we can effectively scale the items, particularly in a case where we're going to use items of diverse type, which we may well do in this particular case. Third, we need to be assured of the validity of our measure. Fourth, we need to determine how to estimate prevalences for subgroups that are defined from the measure, because this represents an important avenue to *interpretation*.

Exhibit 3

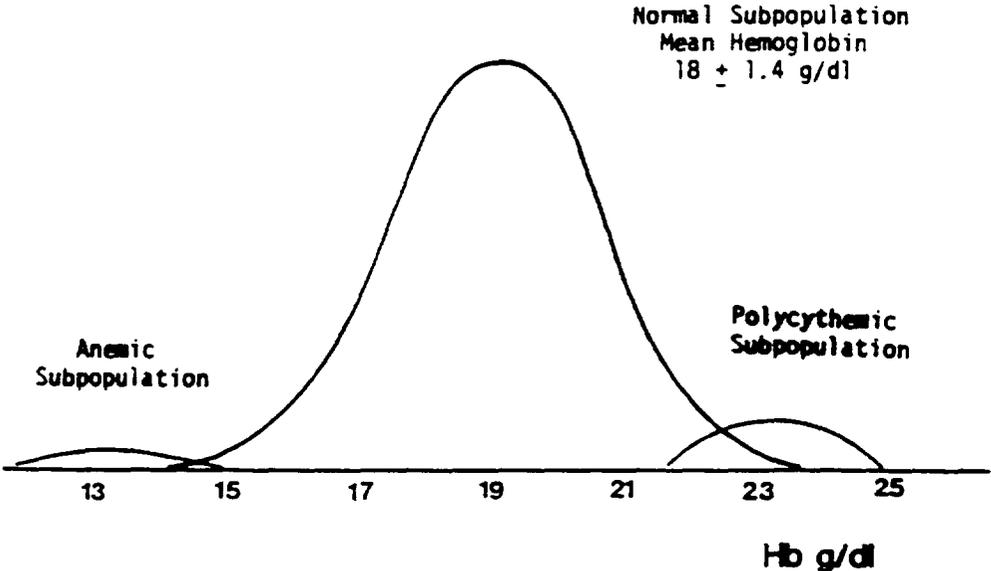


Exhibit 4

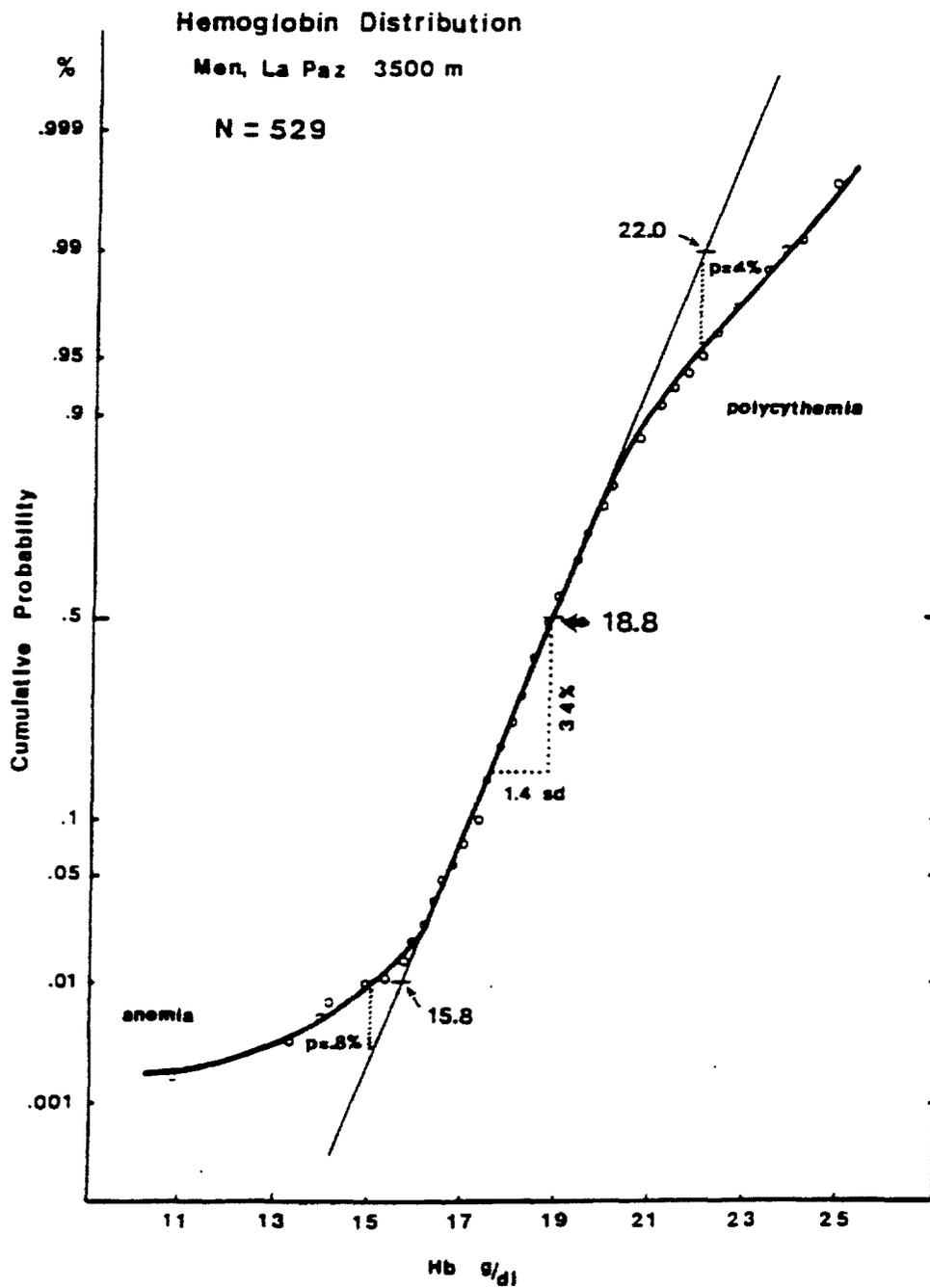
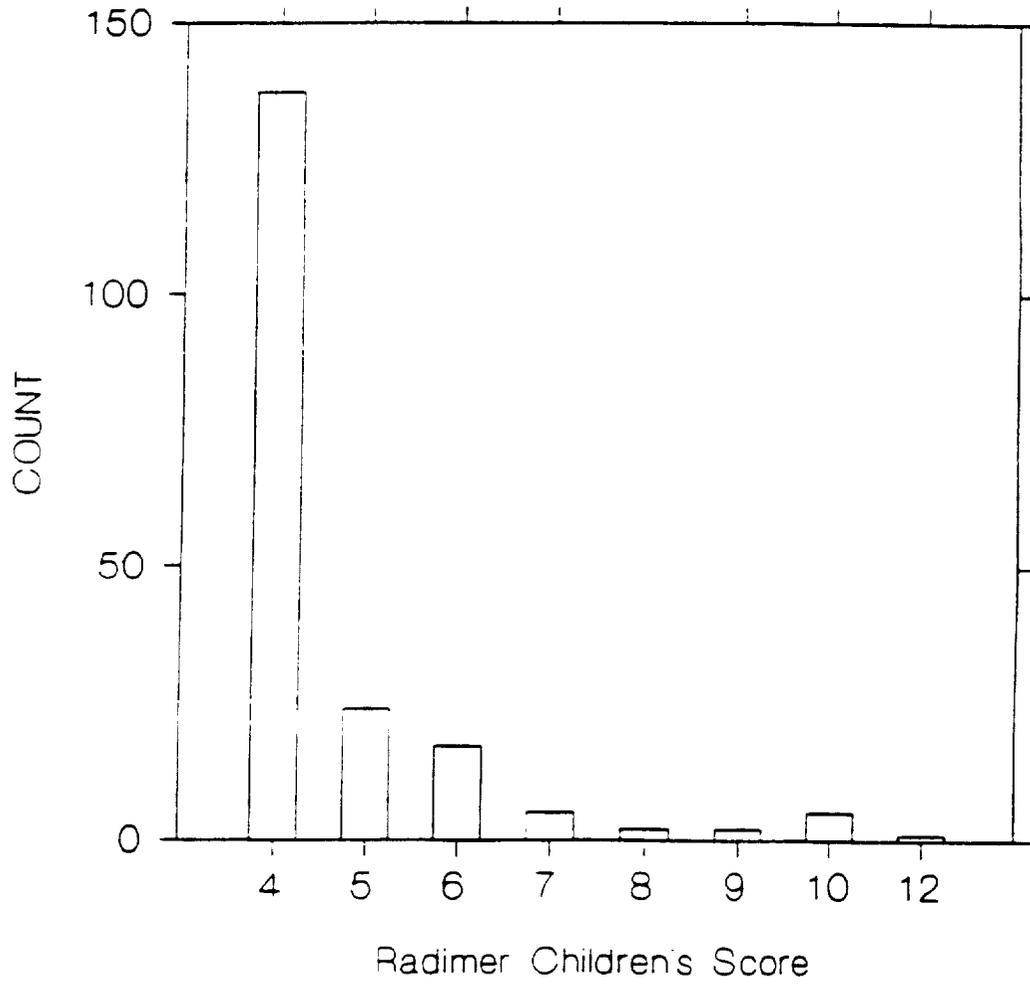


Exhibit 5



BRUCE KLEIN: Thank you, Ed. We have some time now for questions. Would someone like to ask one of the presenters a question about their presentation? Do we have any questions about the presentation? Everyone is dumbfounded by these presentations. That's good. I'm glad you enjoyed them. We're going to take a break now, and we will re-adourn at 3 o'clock. Wait, Gary has a question.

GARY BICKEL: I have a question for Valerie Tarasuk. Valerie, this is on your observation that hunger cannot be understood, and in fact is likely to be seriously misunderstood, if it is abstracted from the social and material cultural context in which it exists, the context of poverty. You described for us the research challenge you see in finding ways to identify and measure that social and material context of poverty as a basis for understanding and measuring hunger. Do you have any suggestions along those lines? How do we best go about doing that, do you think?

VALERIE TARASUK: I was hoping I wouldn't get that question. When I was planning to make that remark, I was thinking that an example would have been helpful. I'm not sure I have one that is very good for you people.

One of the very practical suggestions that I've got has to do with this notion of periodic hunger, and defining that resource base better. I know that as someone who has not been a part of this dialogue before in the United States, I only get to read what gets published in journals that come across our border, so I am limited. But my impression is that much of the work that has been done on hunger, when it has been related to social and material environment, has been done in terms of income—looking at a relationship of people's experience of poverty according to some index—and hunger.

I think it is possible to go one more step and to begin to describe the programs. I know from a Canadian perspective, if we had those kinds of distributions I would want to know exactly what kind of income supplement programs and assistance programs these people in this one cluster who are reporting hunger regularly—I would want to know the programs from which they came. I think their reports of hunger are a dramatic statement about the inadequacy of those programs. But the programs need to be named, right? They need to be named if we want to see program and policy initiatives happen that would crack them.

Furthermore, the notion of irregular hunger and precipitating events—I think there are events that regularly tip the delicate balance of people's income maintenance and drop them into severe poverty that eventually results in hunger. We need to get better at cataloging those things. We now have good questions that ask things like, because you ran out of food or food stamps or money, you can say yes to all of those things, but you haven't told us what to do about it, right? It might be helpful to begin some qualitative work.

I don't know if that is necessary. Again, I plead ignorance because of being a Canadian. But it is necessary to develop better the range of activities or circumstances that can tip people over. Is that helpful? I just think there is so much more to be done there, and if we really want

to see program and policy initiatives that are the result of research, we have to offer people more than an income quantile.

CHRISTINE OLSON: (Comments off mike.)

VALERIE TARASUK: I guess the most obvious example—to think about periodic hunger, one could think about children in those situations who live in a constant state of compromise, periodically being deprived of food for steady periods of time. I would suggest that those children exhibit that experience in their school performance.

Step back from that then to another extreme case of irregular hunger, which is a one-shot deal, where at one moment in time somebody tumbles into acute poverty because he or she has lost his or her job or has experienced a severe financial crisis and lacks the reserves to buffer that crisis. These individuals may be picked up in a population survey as having experienced hunger within a current timeframe. However, the long-term consequences of that experience may not be particularly important in terms of healthy social ramifications. So to me, those are the two far-end points.

I think that perhaps we need to do a bit more work in understanding the range of possibilities in terms of social consequences as well as health consequences.

JAY HIRSCHMAN: A question for Dr. Cook, please. Dr. Cook, you said in developing a hunger measurement that we should look toward a scale that had somebody classified as hungry or not hungry. Most of the other measures I'm familiar with such as poverty, while they have that ability, also can be scaled so that you can look at somebody at a certain percent of poverty. That has been useful in a policy sense in terms of food stamp eligibility set at 130 percent of poverty and WIC and school lunch at 185 percent.

Could you tell us a little bit more about why you think we should have a single cut point and not something that potentially could be scaled?

JOHN COOK: I want to be clear that I wasn't implying that we should not have an index of severity, which I think could accommodate that need for a quantitative indication of how hungry.

The analogy that you related, Jay, the comparison with poverty, is difficult. It is difficult for me to imagine that we would be able to have a consistent match of poverty with hunger, precisely, although I haven't yet given it thorough consideration. I do think there is a need for, and we have the ability to create, a measure of severity, but 130 percent of hunger or 150 percent of hunger, I think that gets right back into the problem of having several different categories; it is essentially the same problem. I think Ed spoke to that fairly eloquently in setting the cut points. It is not an easy thing to do. It is difficult to avoid arbitrariness in setting the cut points. It would be very difficult to claim that someone was 150 percent hungry instead of just hungry or not hungry.

I think it was following Occam's principle. I think we're on sounder footing if we choose the path of simplicity in this case. That is essentially the basis for my argument for two categories rather than more than two.

I had a thought regarding the question of consequences, if I can call it back up, with regard to consequences of regular versus irregular. The issue of children is very important, and I think recent research in pediatric nutrition has shown that even mild undernutrition, when it is chronic, can have severe and long-lasting effects on cognitive development.

That is a very important area, but I think there is another element that perhaps should be considered. In that case, an analogy with poverty may be useful. We have spells of poverty, and we have people who go in and out of poverty. We have some people who go into poverty and stay longer than other people. We have some people who seem to go into poverty and never get out. Regularly occurring hunger seems to increase the risk of longer duration, once you are there. Conceptually, that seems to be the case to me. Empirically, I can't give you grounds for that claim.

But also, I think that regularly occurring problems, like regularly occurring spells of poverty, put one's capability of avoiding that situation at greater risk than irregular occurrences. So, I would expect the consequences of regular spells of hunger to be chipping away over time at the resilience of a household or family's resources, until finally it becomes much more difficult for them to overcome the spell or occurrence of hunger. That is kind of a gut-level feeling I have about it.

TRICIA McENROE: I'm Trish McEnroe with the Nutrition Consortium of New York State. I have a more general comment. I'm sitting here today, and a number of questions have gone through my mind about what we're doing, as we're honing in on the precision of estimating the number of people who are hungry, and what are we going to do with this number?

As we move in the direction of more narrowly defining this and getting it more precisely measurable, we're eliminating some of the complexities of this problem. Hunger is a very complex problem and it is caused by a multiplicity of factors. I just want to bring that into the mix.

As Jay Hirschman mentioned, what we do here today may have a significant impact on a whole host of feeding programs that are in place and were put in place for a reason. Yet, as you look at some of the narrow definitions that have been talked about today in terms of taking care of peoples' food shortages, aren't we forgetting to look beyond that to our broader goal of preventing basic health problems? One of the reasons we got into the business of providing food to families, as a country, is to improve the overall health status of the population. We want to address the problem of chronic hunger but we want to look at the broader issue of health and nutrition too. I think that is important for us to keep in mind as we hone in on this definition.

This is an exciting conversation that we are having, but it is a scary conversation that we're having, and I think we have to go about this very carefully and think about the ramifications of what we're doing.

BRUCE KLEIN: Thank you. If there are no further comments, we will conclude this session. We'll take a break now and we'll reconvene at 3 o'clock for the next session of the Emerging Issues—Technical Considerations panels. Thank you.

Session IV: Technical Considerations (continued)

Chairperson: Gary Bickel

Cultural Factors in Food Security

Janet Fitchen

**Measuring Household Food Security in the Context of Resource
Deprivation and Poverty**

David Smallwood

Measuring the Intrahousehold Dimensions of Food Security

Eileen Kennedy

GARY BICKEL: Clearly, the one thing we have not scheduled enough of in this conference is time to discuss together all these interesting presentations that we are hearing. But it is now 3 o'clock, so we need to move along with the next session dealing with some more of the emerging issues in measuring hunger and food insecurity.

We have a very interesting panel, consisting of Dr. Janet Fitchen, professor of anthropology and rural sociology at Ithaca College; Dr. David Smallwood, who is the senior economist and Chief of the Food Policy Research Section of the Economic Research Service at the Department of Agriculture, and Dr. Eileen Kennedy, who has had a distinguished research career, for the last few years working at the International Food Policy Research Institute here in Washington.

We'll begin with Professor Fitchen, who in her brief bio mentions that she has had a long-standing interest in poverty and in rural matters. Living in Ithaca, New York, it is not hard to be very much aware of both of those. In 1981, Dr. Fitchen published a long-range, in-depth, ethnographic study of pockets of rural poverty in upper New York State. Since then, she has continued to work on this theme—I thought the title she ascribed to herself, a "roving researcher in rural poverty" across the United States, sounded very intriguing. So, Janet, would you please lead off?

JANET FITCHEN: If you all don't mind, I'm going to speak from down here.

I come on this program sandwiched in between presentations that are really quite technical, having to do with measurement and scaling and so forth, and I am kind of quaking in my boots about that, because that is not my field and not my strength. People who have carefully developed survey instruments and then done very thorough analysis of them, they really advance what we're doing a lot. I see my role, in contrast, as spending my time out in the field and then talking with researchers and saying, here is what I am seeing out in the field. Can you devise a way to go and measure it? Or conversely, people who are devising various kinds of instruments come to me and say, how do you think this question would work for us in the field? So, I see myself as somewhat of a go-between. That is indeed the role of a cultural anthropologist; you're never quite in one or the other.

I am indeed a qualitative researcher, although not particularly specializing in questionnaires. The main thing that I do has to do with participant observation, field research. What I have done now for more than 25 years off and on is research with low-income people around the country, starting in rural areas of upstate New York. I've worked a little bit in urban areas, but I have taken rural as my focus, and then in several different years taken the show on the road and done research among low-income people in various rural areas of the country.

The kind of research that I do is longterm. You could call it naturalistic research. You could call it ethnographic research in which I am in and out of people's houses. I am going to school with their children. I'm going to court with the adults, standing in line to get this, that, or the other, commodity distribution and so forth. In other words, it is the kind of research that

has a long time period. I am there over and over and I am not asking specific questions and I am not specifically examining issues of hunger or of food insecurity. However, I would have to say that rarely have I been in a home for an observation period or an interview in which there weren't food events taking place or food discussions. Food is in the conversation and it is in the interaction among the people there that I am observing.

So indeed, what I am trying to get at is the context in which food insecurity or hunger takes place, and what is going on within the family. I think that this kind of qualitative research can be useful in informing the development of survey instruments and also in helping to interpret the answers that are gotten in such research. You are assuredly going to see a lot of overlap between what I say here on the basis of my research in the field and what a number of you have pointed out here today in terms of behaviors and patterns and strategies and situations that underlie food insecurity issues and hunger.

Now, I am on the program under a topic called emerging issues. The title that was assigned to me—I will tell you flat out I did not suggest this title, although I am comfortable with it because I'm a cultural anthropologist—the title is called Cultural Factors in Food Security.

Now, knowing as we do that Hispanics, African-Americans, and Native Americans and certain other minority groups are overrepresented in poverty in this country, then that says to us, there is a cultural aspect here. The poverty rates, as we know, are far above the national average in those groups I just named. If 14.5 percent is the national poverty level right now, it is way, way higher than that in most Indian communities, for example.

We know that poverty and certain minority statuses are highly correlated. We also know—I think everybody assumes, but it is clear from some things said this morning that we know—that there is a high correlation between poverty and food insecurity. I was pleased to see some real data on that this morning.

In that case, you would conclude that we do need to be sensitive to cultural aspects of food insecurity. It is out there. We need to be sensitive to cultural differences, ethnic aspects related to food insecurity. So it is logical that a cultural anthropologist is talking on that topic. Anthropologists are fond of saying that homo sapiens is the only species that eats on the basis of cultural principles. Eating is a cultural act—what we eat, what we don't eat, what we want, what we dream about when we have food dreams, are all culturally shaped. It is not shaped by our metabolism at all. Eating is indeed a cultural act and we study all the social meanings of food and so forth.

So I could entertain you with what cultural anthropologists have come up with about cultural determinants of how people eat, but I'm not going to do that. My research over the years, in fact, leads me to go in the opposite direction, and I'm really going out on a limb. I'm standing here as a cultural anthropologist and I'm going to say to you that poverty overrides ethnic differences in determining and shaping food insecurity in this country in this day and age. I feel very strongly about that. I may be read out of the American Anthropological Association,

but I think that is the case. I have looked in various different places around the country and in different ethnic groups.

Yes, we need to be sensitive to the cultural diversity in order to design programs that will do things for people. We need to know their cultural preferences and ideas and meanings and so forth. But food insecurity, I would maintain, is an economic or class issue more than a cultural one.

What has struck me as I have traveled around the country in homes watching behaviors related to food is that the eating patterns are really quite similar among poor people all across the Nation, and I'll talk about that in a minute. Even the ways in which people manage their food insecurity, their food shortages, in which they try to postpone real hunger, or as Christine said, avoid being "hungry hungry," those ways, those strategies are relatively similar across different groups.

Take for instance the Zuñi Indians, who suffer from a very high rate of obesity, heart disease, adult onset diabetes. They have got that not because they eat classic Zuñi food; they've got that because they have got a diet that is very high in generic U.S. junk food. There is nothing acutely ethnic about that.

Mexican-American parents in the Southwest told me quite precisely the way in which they were sacrificing their own food needs so their kids would have enough. That is not just Mexican-Americans; that was a very common theme in the earlier in-depth research that I did among people who go by the title white non-Hispanics, who are non-ethnic, as it were. It is a very common pattern across all of those differences.

Yes, there are some limited ways in which culture does affect what people eat. If you're going to pick one cheap filling food, the one you pick may be decided on the basis of your cultural preference, whether it is beans or rice or potatoes or pasta, without any meat sauce on top of it. When you're down to the cheap food and you're down to mainly one, the one you pick is going to be culturally appropriate to you in most cases.

But that is a relatively minor difference. Back to some points made this morning, what they are doing is they are eating a diet that is monotonous. I would have to say that a monotonous diet not only has nutritional problems connected with it, it also has the problem of pan-United States culture. Whether you are a Zuñi Indian, whether you are a Mexican-American in Eastern Washington, whether you are an African-American in Mississippi, you are a poor American, but you are an American. You are subject to the same consumerism, you are subject to the same advertising, and you want the same food. Your kids come home from school and they want the same food that their friends have at school.

In addition to that, you want variety and choice, which is a major tenet of American culture, choice and variety. That is what our supermarkets are all about. You go to the supermarket in Lusaka, Zambia, and there might be 20 shelf feet of cereal, but it's all the same

kind of cereal in one kind of box and one kind of size. Americans want variety, and we want to be able to choose. I think poor Americans, even with their cultural heritage intact, want choice in at least some of the things that they eat.

Culture does play a little bit of a role also in some of the coping mechanisms. I would certainly suggest that the African-American families that I visited in Mississippi, Native American families in the Southwest, and so forth, have a little bit more in the way of an extended family intact and it is acceptable to them to be using the extended family network. However, I also find that very strong among white and non-Hispanic nonethnics who are poor. It just doesn't happen to be so much of a middle class thing, so we don't think that it happens, but it does happen out there.

There are also interesting and I think very important locational differences, and I would urge as we develop these kinds of measures that we look at differences between rural and urban. For instance, to go back to a talk this morning—what about the food system? Where is the competition among large supermarkets in small-town rural America? It is not there. Where are the food banks in small-town rural America? They are few and far between. If we ask somebody the question, how many times did you go to the food bank last year to get food, the answer might be zero, but that might not mean that they didn't need it. It's just that there wasn't any within 100 miles, and it wasn't worth driving 100 miles to get a sack of food. So, we need to pay attention to rural differences.

What I have done, then, is to come up with some eating patterns of the poor that I think transcend the ethnic differences and that do reveal food insecurity. So, I just want to run down those (see Exhibit 1).

First of all—and this is just where we left off a little bit before the break—there are the temporal fluctuations in food availability and supply. I think those are very, very important. The way I have arranged it here, you could say that there are the regular ones that come up periodically, and we need a lot more research in the area of why those come up, and there are the irregular ones, and they have to do with all sorts of things like family functioning and so forth. I think we also have to see if these are both long term and short term, or which they are. I think there are real important differences, and that was touched on before, so I won't go into that a whole lot more. But, I find that really across all ethnic groups, you have both of these kinds of fluctuations.

Exhibit 1

**EATING PATTERNS OF THE POOR THAT TRANSCEND ETHNIC or
CULTURAL DIFFERENCES AND REVEAL FOOD INSECURITY**

1. TEMPORAL FLUCTUATION IN FOOD AVAILABILITY OR SUPPLY

FOOD SUPPLY REDUCTIONS

Regular, periodic	Short duration
Irregular, episodic	Long duration

2. UNEVEN DISTRIBUTION OF FOOD WITHIN HOUSEHOLD

FOOD INTAKE SACRIFICES

"Voluntary"	Quantity
Involuntary	Quality

3. PSYCHO-SOCIAL TENSIONS SURROUND FOOD

FOOD-RELATED TENSIONS

Individual – deprivation anxieties
Interpersonal -- family frictions

4. PRIORITY OF SATISFACTION GOALS OVER NUTRITION GOALS

TRADEOFFS IN PURCHASING
& CONSUMPTION

Minimizing sensation/perception of hunger
Satisfying societally-induced food desires
Ensuring nutritional well-being

5. UNPREDICTABILITY OF MEALS

VARIABILITY

In frequency or timing
In number of eaters

Another one that I find goes across all ethnic groups, is uneven distribution intrahousehold. There are major things there that are going on. Just for starters, note that I put both voluntary and involuntary. Of course, I did put voluntary in quotes. One of the most frequent patterns that has been alluded to is that the adults, and particularly the mother, regardless of ethnic group, will reduce food intake to save for the children, staving off actual hunger for the children. One woman told me that this was in a sense enlightened self-interest, because she wanted to keep the kid off of her back. If the children are perceiving hunger, they are adding to her woes in asking for food. So, voluntarily, she or other adults in the family may reduce their intake to stave off worse problems. But they may do that in either quantity or quality of food, and the quality goes first. Many, many of the women will have just the basic starch food to fill themselves up so they won't feel hungry. If it is pasta, they will give whatever meat or vegetable sauce there is to the kids' portions and they will merely lick the pot, or eat whatever the kids don't eat.

There is also involuntary. That, is for instance, a child who cannot control the size of the portions. That happens a lot. Sometimes it is more apt to happen, I suspect, though there isn't enough research on this, in a kid who is somehow an anomaly in the family, a kid who is "his" child from a previous marriage, a kid who is also what the social workers and psychologists call an FLK—funny-looking kid—or a kid who has a behavioral pattern, a kid who doesn't quite fit into the family. A kid who is clumsy and spills his food on the floor will not be given as much. So there are all of those kinds of things that are happening too.

Sometimes it is very hard to tell whether it is voluntary or involuntary. A woman who I was interviewing in Eastern Washington who happened to be Mexican-American described to me that she had not eaten in three days because she needed that food to go to her child. This was not an ethnic pattern. She was however something like 6½ months pregnant, so you had involuntary as well in terms of her next child.

Psychological tensions. To speed things up, I will just say very briefly that I see an awful lot of this in households. Individuals with food anxieties, little kids just standing there looking in the cupboard to see if there is any food, standing there looking in the fridge, just 10 minutes at a time looking at the food supply, wanting to be sure that there is enough. But also, I see an awful lot of interpersonal stuff, an awful lot of tension, arguments, physical fights over who spent what money on what and how it is distributed within the household. That cuts across ethnic groups.

Priority of satisfaction goals over nutrition goals. I see this very strongly. You would like your kids to eat well, but the damage from their not eating nutritionally won't be seen today or tomorrow or for awhile. So what people are going for is minimizing the sensation of their own hunger or their kids' hunger. Also, maximizing societally induced food desires. If you can give that kid something that he or she is begging for, if it both fills and it says, "my mom is able to give me what the other kids are bringing to school," that does double duty for that woman.

The other thing is unpredictability of meals. There is a lot of variability in the frequency or the timing, and sometimes it is hard to tell. If you ask somebody, did you skip a meal yesterday, and there wasn't a meal served at breakfast time, they have difficulty saying whether they skipped breakfast. I didn't skip it because there wasn't any. We need to watch out about that a little bit.

Also in the number of eaters. Not only do we, as various of you have pointed out, send our kids over to somebody else's house just at mealtime; we also have somebody else's kid over at our house. This is a reciprocity deal; it is not a one-way street. That is very common across ethnic groups. The only thing is, where you have a number of people coming into your house to eat, it means your food supplies are depleted faster, and that may lead to one of these periods (see Exhibit 2).

Just a quick, quick summary, then, on my other handout, which is trying to figure out why the patterns that I observed are there. Yes, ethnic preferences are in there. Why put knowledge about nutrition and health here? I spent a lot of time tagging along with the EFNEP, Expanded Food and Nutrition Education Program, the paraprofessionals that go into homes. I would say that is there too, lack of knowledge, although it may not be as abysmal. Some people who are responsible for food in the home know very well what they should be feeding their kids; some people are clueless.

Influence of dominant American culture is a biggie. Just as you need to get your kid the kind of sneakers that all the other kids in school have, you also need to get these other foods. You need to spend money not only within the sector that is food, but within the other sectors of our expenditures. That is where American consumer society and wanting your kids to feel that even though they don't live in a very good house, and even though sometimes we have to go hungry, and even though and even though, when we've got some money, we will get what you're asking for. What you're asking for might not be nutritious food. That is a real big influence.

Poverty is the biggest. So if I were to draw an arrow on there or some sort of indication, I'd make a big crescendo down towards this last one, poverty. I would say each one of these is more powerful than the one before in influencing food insecurity and hunger and poverty is the most powerful of all.

GARY BICKEL: Great, thank you so much, Janet. Moving right along, Eileen Kennedy is going to go next, coming to us from the International Food Policy Research Institute. Eileen and I were colleagues here in the Food and Nutrition Service in 1980. Eileen, it's great to have you with us.

Exhibit 2

CAUSES OF OBSERVED FOOD PATTERNS OF LOW-INCOME AMERICANS

(Listed in increasing order of importance, the most important cause listed last)

ETHNIC PREFERENCES

LACK OF KNOWLEDGE ABOUT NUTRITION & HEALTH

INFLUENCE OF DOMINANT AMERICAN CULTURE

POVERTY

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EILEEN KENNEDY: Thanks, Gary. I'm going to change gears quite a bit because a lot of what I'm going to be talking about today relates to work that I have been doing at IFPRI since the early '80s with primarily an international, developing-country focus. Valerie commented earlier about some of the lessons learned from Canada having ramifications for the United States. I think some of what we have been doing in developing-country food security and nutrition monitoring also has some relevance for what is being discussed here today.

I'll skip through some of the statistics and try to make up for some of the time, but clearly, hunger and malnutrition are still of staggering proportions throughout both the developing and the developed world. Estimates vary—anywhere from 300 million to a billion people worldwide suffer from inadequate diets. If one looks at the FAO Sixth World Food Survey, it finds about 20 percent of the world's population have diets that are calorically inadequate. I would add, I think that is an underestimate of the food insecurity problem, because it relies strictly on an energy variable—with all the problems we have with that—to quantify food security. If one brings in other nutrients such as iron, Vitamin A, iodine and so on, the food insecurity problem, I think, looks worse.

Food insecurity, or the flip side, food security, is a very complex phenomenon, agreed. I think part of that complexity is that it manifests itself at a variety of different levels, globally, nationally, different countries, household, and individuals.

Most of my time I will talk about the intra-household dimension. But let me just say, a lot of the monitoring of food security internationally has moved away from a production self-sufficiency or food self-sufficiency definition at a national level, very heavily influenced in the 1960s and '70s by the problem with production insufficiency—agricultural production. There wasn't enough food. Countries used availability of food at a national level as a proxy for food insecurity/hunger. We now know from lots of work that has gone on that availability of food at a national level is a very poor proxy for the food insecurity problem.

You can take almost any country worldwide—let me pick one where I have worked since 1981. Kenya, where at least up until the mid-80s, food sufficiency at a national level looked fine, but yet you were still getting 20 to 30 percent of the population consuming diets inadequate in calories. I think the same situation is in the United States. When people find out I am coming to a forum such as this, international people with whom I deal, they inevitably ask, how can the United States have a problem? Same message: it is not availability of food but, Janet's point, access to food.

Our work has shown clearly that the two biggest correlates of hunger and food insecurity at the household level are income and prices, both of which are related. One way to improve hunger at the household level is either to increase income or decrease food prices.

Now, from the point of view of monitoring and evaluation, a lot of the measures I've heard discussed here today are almost at this point totally beyond the capability of most monitoring systems in developing countries in which we have worked in Asia, Africa, Latin

America. We became very heavily involved in what was called and is called a nutritional-status monitoring-system effort, which was a collaborative effort with developing countries worldwide. It began in 1989. The first step of this exercise was to find out from the implementers and users of monitoring systems what the problems were.

We did an inventory of responses, 32 different monitoring systems worldwide. Although the implementing agency for these monitoring systems varied—agriculture, central bureaus of statistics, and ministries of health—one common plea that came out of this inventory was a plea for—and I will use the word that they use—user-friendly indicators of food security at the household and individual levels.

I think most of our collaborators agreed that if they had a good measure of either household income or something like total expenditures at the household level, a clear belief was that a good poverty measure would be indicative of the magnitude of the food insecurity problem. Those measures were very difficult to incorporate and sustain in the ongoing monitoring systems we have been dealing with, so they are looking for user-friendly or proxy measures for household food security and also for individual food security.

As a result of this articulated concern, we began a three-pronged exercise, looking at the literature—what studies had told us were useful indicators of food insecurity. We also pulled together about seven or so different data sets from Asia, Africa, and Latin America that allowed us to look at the links between household factors and household food security and how this influenced food security of individual household members. Most of the individuals we were looking at were preschool-aged children.

What we found, and I think this is somewhat surprising, is that relatively simple but available and easy-to-collect variables could do well in locating the food insecure individuals in households. When I say relatively well, I mean they can do as well as if one had a good measure of household income or household expenditures. What we were doing was clearly not a true validation study. With these data sets, what we were doing was looking at a benchmark standard, which we defined as household calorie consumption from a series of measures, and taking less than 80 percent of household core consumption as the benchmark and then comparing this standard to some of these other proxy measures.

The ones that came out as very promising were factors such as high dependency ratios, which were very closely related to household food inadequacy. By that, I mean the ratio of children in the household to adults. As that index got larger, more children to adults, the likelihood that a household was food insecure increased dramatically. Household size was also a good proxy for household food insecurity.

Number of unique foods consumed is a good one. I think this is similar to what you were saying, Janet. As the number of foods consumed in a household increased, the household was likely to be less food insecure. The most food insecure households were ones which had a very unvaried diet, disproportionately relying on a few staple foods for consumption. We then

were interested in looking at the relationship between household food security and individual food security. Most of what I'm going to be saying is related to preschoolers within a household. I am summarizing what comes out of some 40 odd tables and a 90-page report, which I will be happy to share with the audience. I would suggest that anybody who is interested in the full report, give their name to Gary Bickel or Bruce Klein and we'll see that they get the full complement of the data.

Just as we found that food availability at a country level is not a very good proxy for household food security, household availability of food in most of the countries in which we have worked is not a very sensitive proxy for individual child food security. I think one needs to bear that in mind when you think of programs targeted to households.

Many studies have found that preschoolers with caloric inadequacies come from households where caloric availability is either at or above 100 percent of requirements. I think there were many factors coming out of our studies which influenced the intrahousehold allocation of resources. The income-earning patterns of different individuals within the household are important. Women in a number of our studies are more likely to allocate income that they either earn or control to diets of children. Education of the mother is a significant influence, as are characteristics of individuals such as gender, age, birth order, genetic endowment, and more subtle factors such as decision-making power of the child's caretaker.

Similar to what was done for the household-level analysis, we wanted to look at proxy indicators for child-level food security. Surprisingly, in these very diverse country settings, the proxy indicator which has come up consistently as indicative of risk of caloric inadequacy at the preschool level was number of eating occasions. As the number of eating occasions increases, the likelihood that the preschooler is consuming a diet inadequate in calories decreases. This is controlling for income level of the household, other SES characteristics, assets, and food availability at the household level.

I should describe what it is that we find that corroborates the quantitative data. When the preschooler is not getting enough food it is not entirely because of bias in the allocation of food to children. As part of the ethnographic work that went along with these quantitative household surveys, we asked the caretaker how do you know if your preschooler is getting enough food, asked in slightly different variations of that question. The overwhelming response from the caretaker was, when the child says they have had enough food. In fact, the child may be saying they're having enough food, but when you look at the energy intake you find it is substantially less than the recommended requirement. In a number of the places in which we have worked, we find that one of the dominant factors in explaining inadequate intake on the part of the child is a generalized anorexia that has set in due to chronic illness patterns in the child.

I bring this up because it seems to me that the solution is a combination of not simply resources at the household level, although they are very important, but in tandem with education of the caretaker as to what the needs of the child are. Places we have worked, I see the solution

or the necessary action being to increase effective resources of the household, but also education combined with that.

The third part of this whole scenario was that the analysis I talked about was based exclusively on extant data. We then went forward with a series of prospective studies in five countries, including Guatemala, Kenya, Mali, Ghana, and India, to test out what had come across as potentially useful indicators of household and individual food insecurity, to look at what they were telling us. In our prospective studies we compare variables such as the number of separate eating occasions of the child to enumerator observations of the child's food intake, to a series of 24-hour recalls, and to food frequencies. We find that in at least two of the countries in which the data are recent, '92 and '93 data from Kenya and Ghana, that in this prospective survey the number of separate eating occasions still comes out as a very strong determinant or risk factor for identifying the food-insecure preschooler.

One caveat is that there has been a lot of emphasis put on household and individual caloric consumption as a proxy for overall hunger and food security. I think we need to get a little bit beyond that, both in developing and developed countries, and think about the overall child diet. For a number of years, collaborators with whom I have worked have used caloric intake as a proxy for overall diet. What we are now finding is the whole concept of hidden hunger—that it is more than just calories, it is also the nutrient density of the diet. We are finding micronutrient inadequacies in diets that in some cases are apparently adequate in calories and we are looking at some good measures of that.

We have analyzed a number of our datasets, both at household and individual levels, and calories are not necessarily a good proxy for overall micronutrient intake. A particularly problematic nutrient is Vitamin A. What we find in a number of our studies is that as household income increases, household caloric intake increases and, in turn, child caloric intake increases. However, the Vitamin A intake of a number of these preschoolers actually decreases with increasing income, and that is because the households are moving toward a more processed food diet and lower-status, beta carotene-containing foods decrease.

How would I use this information? First of all, I realize there is going to be a special module inserted as part of the Current Population Survey. I think potentially there are a number—or at least one or two—key indicators that are easy to collect and easy to analyze and that can be integrated both into the CPS survey and into other survey efforts that are represented in this room. On an ongoing basis, periodically, these would give us some indices of what is happening to the food security and hunger situation in the United States. If one wanted to move forward and perfect some of these indicators, I would suggest analyzing existing datasets that would allow you, with extant data, to validate some of these measures. Also, you should not limit yourself to one survey such as the CPS, although that is very good, but maximize what one could get out of the various surveys that will be conducted over the next 1 to 2 years. Finally, the end point for me—based on what one finds in certain segments of the population or certain regions of the countries, in these indices indicating increasing hunger—is a plea to use that information very quickly to have it translated into action.

Food Security

- **Command Over Food Resources**
 - **Acceptable Foods**
 - **Acceptable Access**

- **Command Over Nonfood Resources**
 - **Health Care**
 - **Housing**
 - **Other Needs**

About a month ago during the holiday period, I left work early to get a jump on the traffic. And, after I had been in the traffic for what seemed like an extremely long time, I took some measurements. I looked at my watch and saw that it had been a long time, a full hour. I took other measurements. I looked at my speedometer and it read 5 miles per hour, just as it had every other time I looked at it the previous half hour. My anxiety level by any known measure was extremely high. It had been high for the last 15 minutes and didn't seem to be getting any lower. My anxiety and feeling of frustration were both very high, much more than usual. It seemed to be directly related in an exponential fashion to the difference between my actual speed and my desired speed.

This disparity between my desired and actual speed required my car and me to go about half the distance home in about twice the amount of time it usually takes. At this rate, it would take another hour to get home. Many of you may have guessed what my real problem was. Why was I so frustrated? What was causing the problem? How could it be solved?

Was it something I had control of, my driving knowledge, my skill or ability? No, by all accounts I am a very good driver. I wasn't lost, I knew the route between work and home. No, I hadn't forgotten where the accelerator pedal was, nor how to use it.

Was it the car? Was it mechanical problems, like a badly tuned engine or a blown head gasket, or maybe the gasoline? No.

Was it something the State had control of? Was the speed limit set too low? Was there a traffic accident blocking the road? Do they need to build more roads? No.

Although knowing my speed and time on the road and anxiety level were important, they were not sufficient to understand the problem. That is, they are measurements without a purpose. There is no context in which they can be used to address my problem, even though these measurements were reported with an acceptable degree of precision and accuracy. All of these measurements indicate a problem. But none of them told you enough information or gave you a clue about how to solve my situation.

Measurement needs to take place with a purpose. In my case, the purpose was to improve my commute time and reduce my anxiety level. But, the measurements did not help because the problem was out of my control and it did not help the State transportation system because the underlying problem was not identified.

Maybe if I had reported the date, this piece of additional information would have allowed you or someone else to establish a link with another database, in this case, the weather. It had been snowing, the roads hadn't been plowed, and the express lanes weren't open. This was only the second time in a year they had failed to open the express lanes. I sure wish the State had that additional piece of information. It seemed like opening the lanes would have been an inexpensive remedy to my problem. But that data wasn't collected.

Of course, there was some satisfaction in watching the news that night and counting all the people stuck in traffic, but that was not nearly the satisfaction I would have had if the problem had been cured.

Now, what in the world do my commuting problems have to do with measuring food insecurity?

Measurement with a purpose: Measurement is important, but it must be measurement with a purpose (see Exhibit 2). The purpose in this case is to measure the extent of food insecurity. How many people are food insecure? Who are they? How severe is their insecurity? What is the cause of their insecurity? Do they have insufficient money or food stamps? Lack of access to stores, lack of shopping skills, or are they limited in mobility, like some elderly? What programs are individuals eligible for? Have they slipped through the cracks in the current system? Are they participating in programs for which they are eligible? Why or why not? Are their benefits sufficient? Is food security just one of many problems for these households? What is the best way to solve the problem?

Can we learn more about these individuals and their problems? Is it primarily a poverty-related problem, or is it something else? Can we bring other bodies of research or knowledge to bear? Can we link to some other surveys and data in research? We must at a minimum be able to link the information back to program and policy levels that we can control, either now or in the future (see Exhibit 3).

Counting the food-insecure is not, in my opinion, a sufficient reason for conducting a survey. We know they are out there. We know they will turn up in a survey. And when they do, what will we be prepared to say or do? Will we be any closer to understanding or relieving the problem?

Now back to food. Why should we collect data on food spending (see Exhibit 4)? As you well know, USDA will spend about \$40 billion this year in 14 different food assistance and nutrition programs. Most of this money will be spent through programs designed to increase food-purchasing power or direct access to food for individuals with limited resources or limited control of resources, for example, infants, children, and elderly. It is significant to recognize that the major program levers that government officials currently control relate to providing command over resources and access to food.

Linkages to other data and research: The linkage between poverty and food insecurity is strong. Numerous research studies by economists, nutritionists, and sociologists have established a close relationship between income, food spending, nutrient-based measures of diet quality, and subjective measures.

Measurement With a Purpose

- Count Insecure
- Assess Severity
- Assess Causes
- Assess Programs

Exhibits 3 and 4

Exhibit 3

Major Issues

- Measurement With a Purpose
- Linkages

Exhibit 4

Why Food Spending?

40 Billion Reasons

We need to build on these linkages and capitalize on the vast information and knowledge base that other surveys and other bodies of research provide (see Exhibit 5). This linkage would provide a multiplier effect on which we could extend our data and knowledge beyond that which is reflected in one survey. We would be able to gain additional insights into the food security issue from this linkage.

Because of the close relationship between command over general resources and command over food resources, our survey could benefit from the extensive experiences of those working on poverty measurement. For example, a critical issue in poverty assessment is determining what constitutes an adequate level of resources. A parallel food security issue is establishing an adequate level of food spending.

Measuring food-spending adequacy: A number of alternatives have been proposed for measuring food-spending adequacy, and these are generally categorized in one of three types, absolute, relative, and subjective (see Exhibit 6).

- Absolute: measured by the dollar value of some "minimum" standard basket or consumption level, such as the food-basket cost underlying the official U.S. Poverty Income Threshold.
- Relative: measured relative to the lowest 10 to 20% of the household food spending distribution or some fraction of the median. Half the median income closely approximated the official poverty line in the 1960's. The Thrifty Food Plan is at the 10 to 12th percentile of the food spending distribution. Relative measures will change with the distribution.
- Subjective: usually based on household surveys of self-reported evaluation of income adequacy.

The cost of the USDA Thrifty Food Plan, the successor to the Economy Food Plan that is the foundation of the poverty income threshold, is an example of an absolute measure of food security. It is important today because it provides the basis for the calculation of food stamp benefits. The Thrifty Food Plan incorporates nutritional requirements, food preferences, food prices, and total food cost. But as objective as this approach may be, it is still subject to much debate as to its adequacy. Some argue that the costs are too high, others that they're too low. Some argue about the prices, others argue about the palatability. Still others argue about the level of food preparation skills and time required to prepare the food. All these aspects require some value judgments on the part of government officials or expert panels.

Each approach to poverty assessment has advantages and disadvantages, but it should be recognized that all involve some degree of subjectivity. The major difference is whose value judgments are being used, those of government officials, of an expert panel, or of individuals in society.

Exhibits 5 and 6

Exhibit 5

Linkages

- Programs and Policies
- Other Surveys and Data
- Other Research

Exhibit 6

Alternatives

- Absolute
- Relative
- Subjective

Subjective measures: Molly Orshanski, the developer of the U.S. poverty income threshold, said:

...poverty, like beauty, lies in the eye of the beholder. Poverty is a value judgment; it is not something one can verify or demonstrate, except by inference and suggestion, even with measurement error. To say who is poor is to use all kinds of value judgments. The concept has to be limited by the purpose which is to be served by the definition. There is no particular reason to count the poor unless you are going to do something about them. Whatever the possibilities for socioeconomic research in general, when it comes to defining poverty, you can only be more subjective or less so. You cannot be nonsubjective.

The subjective approach to defining poverty has been advanced by Goedhart et al. (1977), by Van Praag et al. (1982), and by others. The fundamental premise underlying this approach is the intuitively appealing notion that individuals themselves are the best judges of their own situation. This method is based on the household's self-evaluation of alternative income levels. The respondent is asked to list various income levels they would regard as very bad, bad, good, et cetera. With this information, along with the respondent's actual after-tax income and household characteristics, poverty thresholds can be developed (see Exhibit 7).

SUBJECTIVE MEASURES: AN INCOME EXAMPLE
We would like to know which net family income would, in your circumstances, be the absolute minimum for your household. That is to say, that you would not be able to make ends meet if you earned less. In my (our) circumstances, I consider the following net family income the absolute minimum _____ per week/per month/per year (circle the period).
Goedhart et al. (1977) and Danziger et al. (1984)
<i>Subjective Measures of Poverty and Food Security</i>

Exhibit 11, shown later, shows subjective measures. The major advantage of these is that they are based on society's self-evaluation rather than that of government officials. The drawbacks include the question of whether or not individuals are capable of ascertaining income levels which would be barely adequate for them (see Exhibit 8). However, those closest to these thresholds are likely to be the best judges of minimum need. Statistical models can be used to calculate adjustments for respondents' current income, household size and composition, geographic location, housing prices, and other factors.

Exhibits 7 and 8

Exhibit 7

Example

Which after tax monthly income would you, in your circumstances, consider to be very bad? Bad? Insufficient? Sufficient? Good? Very Good?

very bad	_____
bad	_____
insufficient	_____
sufficient	_____
good	_____
very good	_____

Exhibit 8

Example

What amount of food spending would be the absolute minimum necessary for your needs? That is to say, with less you could not provide a healthy, acceptable diet for your household.

\$ _____ .00 per week

per month

Over the last decade, Jim Blalock, Noel Blizard, and I have conducted a number of studies at the Economic Research Service using subjective measures of food adequacy and food expenditure distributions. These studies make comparisons between subjective food-based thresholds such as the USDA food sufficiency questions, official poverty measures, and the actual and implied household size adjustments of these measures. More recently, as was discussed this morning, Peter Basiotis at HNIS has worked on the food adequacy question and examined its relationship to food spending, nutrient adequacy, and income. These studies seem to suggest that self-evaluation of food security has merit. However, to this point, no one has examined a minimum food-spending question, primarily because one does not exist.

We propose that a subjective measure of food spending be included in a standard food security instrument. Such a measure would be easy to collect, easy to understand, have a predetermined scale of measure (that is, dollars), and provide a link to the evaluation of current program standards (see Exhibit 9).

SUBJECTIVE MEASUREMENT OF FOOD SPENDING A FOOD-SPENDING EXAMPLE	
What amount of food spending would be the absolute minimum necessary for your needs? That is to say, with less, you could not provide a healthy, acceptable diet for your household.	
_____	[] per week

Comparisons could be made between actual food spending, perceived minimum food-spending needs, and food assistance levels (see Exhibit 10). It would be straightforward and easy to construct a food-security threshold in terms of food-spending needs. In addition, measures of severity follow directly. For example, in my traffic analogy, my anxiety level was thought to be related to the disparity between my actual speed and my desired speed. Here, the difference between actual and perceived spending is a measure of the severity of food insecurity.

The subjective measure of need would take into account individual household food needs, local food prices, convenience, quality, variety, nutrition, shopping patterns, and other implicit patterns as perceived by the individuals (see Exhibit 11). A potential problem with this approach that must be addressed during pretesting is the proper framing of the minimum-need question, that is, the context and meaning of the question. What is meant by food spending? Does it include purchases made by food stamps, WIC vouchers, subsidized school meals? What is the meaning of minimally acceptable?

Proposal

Actual and Subjective Food Spending Measures

- Easy to Collect
- Easy to Understand
- Predetermined Scale
- Link to Programs
- Link to Research

Uses of Our Measures

Comparisons of Food Spending

- Actual vs. Perceived
- Actual vs. Assistance
- Perceived vs. Assistance

Subjective Measures

Account for:

Household Needs

Local Food Prices

Convenience

Quality

Variety

Nutrition

Shopping Patterns

Summary: In summary, there is a strong need to provide relevant, accurate, timely and easily used information to policy decision makers (see Exhibit 12). The data collected should not overburden the decision process. Actual food spending and perceived minimum food-spending needs are transparent and tangible concepts. Politicians and bureaucrats alike can relate to them. A food-security line would be easy to develop from these items. They are based on something everyone can relate to. They have a simple expression and can be updated easily.

The value of the data is derived from the information content it can provide to the decision maker. Food spending is a concise measure and full of policy-relevant information compared with measures of anxiety and perceptions of hunger. Food spending is closely related to current programs and policies and builds upon and links to a large established base of research. For these reasons, we believe that they should be the foundation for all food-security measurement instruments.

Food-security measurement should concentrate on actual food spending and income, perceptions of minimum food and income need, and access and participation in food assistance programs. Clarity should be the rule. This symposium offers us an opportunity to do more than design surveys that collect numerous unrelated bits and pieces of interesting data. It offers us an opportunity to design a cost-effective survey that provides relevant, timely, accurate, and easy-to-use information that can improve policy and program decision making.

Thank you.

GARY BICKEL: Thank you very much, Dave. I'm not going to open the floor to questions, because I'm sure there is a host of them, especially on this provocative suggestion we have just heard, which we need to examine closely. Instead, I would like to thank the panel here for very valuable presentations, all three of them. Then, I'll ask that our final panel of the day, what we have considered to be our high-profile panel to discuss the agenda for the future in food security measurement and research, come on up to the front.

Summary

Data	Purpose
Food Spending	Count Insecure
Actual Perceived Minimum	Assess Severity Link Programs
Income	Link Data
Program Participation	Link Research Cost Effective

Session V: Panel Discussion/The Agenda for Food Security Measurement and Research

Moderator: Steve Carlson
Lynn Parker
Marion Nestle
Larry Brown
William Dietz
Barbara Cohen

STEVE CARLSON: Let me begin briefly by saying that what we have tried to do in this closing session, to coin a phrase, is now something entirely different. In contrast to assigning topics to a group of distinguished speakers, we have invited a group of distinguished speakers to speak to their own topics, to look to the future, and to define for us where we go from here. Each of the persons assembled before you has been invited with some forethought to the way that each of them represents an experience or an expertise that is unique and important. Since you would much rather listen to them than to me, I will break from tradition and introduce them all as a panel now, and then we will work out the arrangements of jumping up and down to get to the microphone as appropriate.

For lack of any better reason, we will simply follow the order that is listed in the printed agenda and begin with Lynn Parker, who is the Director of Child Nutrition Programs and Nutrition Policy at the Food Research and Action Center. Lynn and I go back quite a ways. As administrations have changed here in Washington, we have been on both sides of the fence. I think we are now friendly again.

Dr. Marion Nestle, our second panel member, is Professor and Chair of the Department of Nutrition and Hotel Management at New York University. Dr. Larry Brown, our next panelist, is Director of the Center on Hunger, Poverty and Nutrition Policy at the School of Nutrition at Tufts University. Dr. William Dietz, the next panel member, is Director of Clinical Nutrition in the New England Medical Center. Finally, but certainly not least, Dr. Barbara Cohen, is a Research Associate at the Urban Institute.

With that, I will turn the microphone and podium over to Lynn Parker to begin the discussion.

LYNN PARKER: Thanks, Steve. Again, as everyone said before me, thank you for inviting me to talk today. I appreciate the opportunity. I want, like others, to recognize the difficult and really aggressive work that the Department of Agriculture has done in a very short period of time and the wisdom with which they have gone about developing a hunger measure. I appreciate also the way that they have done it, for they have invited all of us—public experts and concerned people—to partake in the process and they are listening to what we have to say. They have recognized that there is a problem, something that needs to be monitored, and something that we must do something about. That is a refreshing change in this wintry Washington, D.C., environment.

In preparing for this conference, the major thing I thought about was what is it that we need. What, ultimately, when we leave this room, and by April or whatever date, what is it that we absolutely need. In thinking about that, I couldn't help looking back on the time that I have been in Washington, and how the city and the country have changed since I came here in 1977.

I want to ask you whether you can remember a time when you didn't know what a food pantry was, or even ever heard the term food bank or soup kitchen, except in history books. Can you remember back to when that was?

Do you remember when we didn't have women and children lining up at kitchens and soup pantries, waiting to get emergency food? Do you remember when there wasn't this intricate system, often computerized system, of delivering leftover restaurant food to emergency food sites around cities all over the Nation? Do you remember a time when people weren't begging on the streets? I don't know how many of you have that phenomenon in your own cities, but we certainly have a number of people, including even women and children, asking for money on our streets.

I remember when it wasn't like that here, and I'm not that old, and I haven't been in Washington that long. But I remember a time in the late '70s when none of that was the case. I think sometimes it is important for us to sit back and remember that it wasn't like this at one point. Something has changed, and we have come to take it for granted, but I think it is important to shift our lenses back a minute. I think that is an important thing to do when we're thinking about what we need now.

In the early 1980s we were concerned that at a time of recession and of radically changing U.S. and world economies, public assistance programs were being cut back and food assistance programs were being cut back. We were concerned about what that was going to do to a safety net that needed to be there to help people who were being affected by these economic changes. At that time, after those cuts went into effect, all of a sudden we heard from people all over the country in ways that we never heard before, telling us that people were lining up at soup kitchens and food pantries, that people were running out of food, that people were hungry. The people who talked to us were children's groups, nutritionists, physicians, union members, religious organizations, seniors' organizations, public health groups, nurses, teachers. What we called ourselves then were nutrition or food advocates, not any hunger advocates, interestingly enough. We changed what we called ourselves over the last ten years.

People around the country were saying, there is a problem here. We need to document it; nobody believes that it is happening. Our local officials can't believe it. Ed Meese was telling us that people were going to soup kitchens because they didn't want to make dinner that night. Looking back on it, it sounds laughable and somewhat callous. I was looking back at old files recently in which the Department of Agriculture was saying that hunger was not a problem. Now, here we are, talking about it as something to measure.

We were struggling, FRAC was struggling and researchers, many of whom are in this room, and antihunger advocates, were struggling to figure out how do we measure this in a way that will be convincing to policy makers at the local level, the State level, and at the Federal level. What resulted for us was what we have talked about today, the CCHIP study or the Childhood Hunger Identification Project. Ultimately, that is what we came to as a national way of beginning to document that problem. We went through many iterations in our search for a measure. We did surveys of food pantries that we entitled *Bitter Harvest*, to show people how many more people were lining up. We did a little book called *How To Document Hunger in Your Community* which is still being asked for after 10 years in print. But we did a lot of things to try to help people document this.

Now we are in a different time. Let me describe the context in which I work. I represent many people around this country who have been fighting in Washington to stop the cuts in food assistance programs, to raise the issue of hunger and food insufficiency to policy makers for the last 12 years. It has been a period of time, many of you know, inside and outside of government where it has been very difficult to make those points. We have needed to bring hunger study after hunger study after hunger study up to Capitol Hill to continue to focus attention on the fact that there is a problem here, and that cutting the programs was not going to be the solution to the problem. In fact, that it would exacerbate it.

It would have been so helpful to us at that time if we had some kind of annual hunger measure that we could have pointed to that would have reflected this change, that would have shown that in the early 1980s something different happened, and that something bad was happening out there. Solutions aside, we needed something to show that there was a problem and that the problem was increasing. I think we could have done a lot more over the last ten years, could have involved our energies a lot more in positive action in other ways, if we hadn't had to spend all our time arguing over the fact that this problem was growing larger, and that it was a real problem.

Just as the unemployment rate and the poverty rate, the GNP, the CPI, all of those measures, show us where we're going, show a trend over time, we really could have used and I think still could use, and must have, this kind of measure so that we can monitor this terrible problem of hunger. It would be our canary in the coal mine, to tell us that something is going wrong here.

This hunger measure, as many people have said, has to measure something real, something that the public thinks is real, something the public thinks is problematical. I think it really does have to focus on hunger, on food insufficiency, on what we have been describing all day as hunger and food insufficiency, so that we can keep track of this problem that seems to be increasing in this country.

I also think that the food insecurity issues that we have raised, going beyond hunger, going into areas of worry, of uncertainty, and even into the areas of food safety, pesticides, all of that is useful to collect and has policy ramifications. These data help us inform policy changes and policy development and we need to bring policy makers along to help them understand that, because I don't think that right now food insecurity means anything to most policy makers or most public officials in the way that hunger does. All of that I think will be useful and must be done.

But if I were to ask for one thing to come out of this, even if we do develop ultimately a food insecurity index or whatever you want to call it—I'm speaking now as an advocate and not as a researcher who makes distinctions between words like index and measure and indicator—whatever we come up with, it would be so helpful to have a hunger measure that could be separated out, that could show trends over time, and one that was sensitive enough to capture changes. I am a little concerned when I see the USDA's question consistently showing four percent since 1977. Something is wrong there, and I would like to find out what it is, so that we can find something that would capture what clearly has been a growing problem over the last 10 years.

So, in summary, I urge all of us, as we talk about this issue, to focus on the historical and political context that we're in, as we deal with this great need and this enormous opportunity. Hunger deserves meaningful and timely measurement, timely monitoring, and intervention. I urge us to keep this in mind as we go along. It is not a partisan issue, it is not a political issue in the typical Washington sense. It is an issue of measuring something that deserves to be measured and needs to be measured over time.

Thank you very much.

MARION NESTLE: I too am delighted to have the opportunity to speak with you this afternoon. In listening to the conference today, and in thinking about the issues that people have been raising, I have come to two very simple conclusions. One is that we definitely need an adequate measure of hunger or food insecurity, and the other is that it makes little difference which specific measure is selected.

As background for understanding why I have come to this conclusion, I should explain that I have been interested in ways to measure hunger and food insecurity since 1985, when I was a late-in-life public health student. At that time, I wrote an analysis of 20 hunger studies that I happened to have available. This analysis concluded that the methods in these studies were too

scientifically inadequate to convince anyone that hunger might be a problem in the United States and that much better measures were needed to draw reliable inferences from existing hunger studies.

Fortunately, I did not try to publish the paper, because I no longer believe those conclusions. Since 1985, literally hundreds of additional hunger studies have been published. Two years ago, my colleague, Sally Gutmacher, analyzed statewide hunger studies in an attempt to estimate the extent of hunger prevalence and to draw inferences from those State studies about the national situation. We came to the inevitable conclusion that hunger is a chronic problem in this country and that the safety net is no longer working.

This conclusion led us to larger considerations of welfare policy having to do with jobs, housing, training, education, and health care. On the basis of our analysis of statewide hunger studies, we concluded that more methodologically sophisticated hunger surveys were not necessary to prove that hunger existed and that we already had all the necessary information on which to base public policy. We published these conclusions in the *Journal of Nutrition Education* in 1992.

I believe that our conclusions are still valid. I am entirely persuaded by Lynn Parker that we do need a measure of hunger prevalence that can be used to estimate changes in prevalence over time. We currently lack such a measure; it is badly needed. At issue is which measure to use. As I mentioned earlier, I do not believe that the specific measure makes much difference; I do believe it is important to pick one measure and use it consistently.

My rationale for this view derives from the rationale for this conference. Although they have not been stated explicitly, I believe the conference was needed for four reasons: the need for high-quality research on hunger, the need for more and better data, the need for public-policy options, and the need for advocacy.

The research issue raises the riveting question of how to measure hunger and its extent. This is a research problem of great complexity, just as complex as that of measurement of dietary intake. Both pose extremely difficult research problems that are not going to be solved easily in the near future.

As for data needs, I think that it would be very helpful to identify the size of the "hungry" population. If, indeed, 4 percent of the population can be defined as hungry, that population then includes 10 million people. This figure is highly likely to be an underestimate; there are many nonrespondents to the surveys and the surveys fail to include the homeless and other groups known to be at very high risk.

As for public-policy options and implications, we must begin with the massive expense of food assistance programs. The cost of USDA programs alone is estimated at \$41 billion this coming year. Of that amount, \$30 billion is for just the Food Stamp Program. We can expect

strong and relentless pressure to reduce such expenses. Yet, the need for food assistance has become a chronic problem, one described in detail in the more than 250 hunger studies that have been published and one that does not seem likely to disappear. Whether or not the demand for food assistance is changing significantly would be interesting to know, but the increasing numbers of people who are enrolled in the Food Stamp Program suggest that the safety net at the bottom of the economic ladder in this country is no longer working very well.

I can suggest several policy options to address this problem. The first is to do nothing and leave the situation as it currently exists. A second is to increase funding for food assistance programs. We might also increase access to food assistance programs; convert discretionary programs to entitlements; increase welfare spending; improve welfare policies; subsidize food, housing, health care, clothing, transportation, and child care; improve education and training; or provide jobs. I am sure there are other options that might also be considered. At issue are the ones to choose. How do we make a rational choice of options when all of them, except for doing nothing, will increase Federal expenditures. That is today's dilemma.

Finally, we must consider advocacy. If we knew that the proportion of hungry people in this country was 10 percent instead of 4 percent of the population, would it make any difference? Would it help us choose a different policy option? Would it influence the way in which we advocate policy changes? I don't think so. I think we already have all the information we need on which to base policy decisions. We have a problem in this country, and that problem needs to be solved. Anything that we can do to convince Congress and the agencies to make rational policy choices to address this problem will be useful. For that reason, we need hunger questions on national surveys.

But the particular choice of questions is not nearly so important as that the questions are there at all. In attempting to reach a consensus on the specific questions to be asked, I would hope that the need for institutionalization of hunger questions will take precedence, even if the questions are not perfect and do not meet every individual need. It is most important that hunger measures become integrated into current surveys now, while there is a window of opportunity.

We should be taking advantage of this window. My hope is that the various groups who are promoting specific questions will set aside their differences and quickly reach a consensus on some common questions.

Thank you very much for the opportunity to meet with you today.

LARRY BROWN: I'm smiling both because of being here at what I think is a historic occasion we will all look back on one day, but also for the colleague sitting midway back in the room whom I won't embarrass by naming, who told me that the last time he saw me on a television interview I was scowling, and he wanted to know whether it was due to the subject matter or my personality. So, because I'm afraid it might be my personality, I thought I would test out a smile when I started.

Both the Food and Nutrition Service and NCHS, as well as their parent departments—and I think you have heard it, those of you who are in those agencies—are to be commended, because what you have put together and the work you have done so far is Government at its best. I do think that this will be seen as a historic occasion, perhaps one day something bordering almost on the significance of the 1960s and Molly Orshanski and her colleagues, developing the basic poverty-line standard. What we are doing today and the part of the process that we're in now may have the same kind of public-policy impact and relevance that development of the poverty standard has had.

For too long, a wealthy nation and a decent nation have wrestled with the problem of hunger, its diminution, its return. I would suggest that the central reason we are here is to help end domestic hunger. We're not here to explore our latest interest as academics, or necessarily to promote our newest concepts, but we are convened here to develop an annually reportable baseline hunger measure, by which fellow citizens can understand the dimensions of the problem and therefore be more educated in the debate about it, but also so that policy makers can know its dimensions and program evaluators can measure our progress in terms of the effectiveness of policies.

I respect Marion Nestle deeply. She is a big girl and I'm a big boy, and now I'm going to disagree with her. I think it matters a lot what we call what we're measuring. I want to pay tribute to Jean-Pierre Habicht and Linda Meyers for their article that I hope many of you read, for their eloquent admonition that we in the academic and scientific communities need to do a better job of speaking in terms that are relevant to policy makers.

My mentor, Jean Mayer, who is no longer here in body but is in the minds of many of us, always saw the clear imperative for those of us in the scientific community to speak in ways that enlighten the public-policy process. So, given this, I want to make only one point today, and that is to speak to an issue that John Cook addressed in our synthesis paper, which is the definition of what we're measuring.

I believe that, at this time, if we go too far along the path of measuring "food security," particularly at the expense of "hunger"—and I will show you some tradeoffs in a minute—we almost certainly will have failed in fulfilling the historic opportunity that we have at this time. This is so for three reasons.

First of all, food security is a relatively new concept. It is one of great usefulness to researchers for ultimately understanding the broader context of hunger, and it is highly important. But hunger happens to be the more widely understood concept, and therefore, the more relevant one for policy purposes at the present time. People don't think of their neighbors as being food insecure; they think about them as being hungry.

Three decades ago, Molly Orshansky and her colleagues realized that Americans didn't think of themselves as being income insecure; they thought of themselves as being poor.

Following Meyers' and Habicht's admonition, at least my own interpretation of it, we should speak the way people talk. We can apply scientific standards, which underscore and justify a term or concept, but we should speak the way that the public and policy makers speak. So, for the same reason that the poverty measure was an appropriate choice back then, a hunger measure I think is the more appropriate choice today.

Secondly, both the conceptual and operational definitions of food insecurity remain problematic. In the context of the Current Population Survey, some of its elements raise essential problems regarding validity. In other words, the concept and its operationalization need more work. Food security contains six separate components, each of which we would have to measure if we were to measure truly what we're purporting to measure: access by all people at all times to a nutritionally adequate diet, one that is culturally appropriate, safe food, assured ability to acquire, and in socially acceptable ways.

This definition is at the current moment unwieldy, and some components of it— at the current time, I stress—unmeasurable, especially through the vehicle of the CPS. Some elements are also of debatable policy significance. For example, we might hope that all people have access to food that is socially accepted and culturally appropriate, but I think that it is presumptuous to argue that the apparatus of federal policy be applied to see that people who are steak-and-potato eaters or rice-and-bean eaters get those items if their diets are otherwise nutritionally adequate.

Moreover, a valid measure of food safety in my view is not attainable through the current CPS draft module, which focuses on measuring concern about safety, which is a very different issue from safety itself. Finally, on the second point, were the full conceptual definition of food insecurity to be operationalized and measured, I would guess that it would result in between 50 and 80 million Americans being food insecure. This number, if my guess is in the ballpark, would be largely meaningless in the policy arena.

Finally, the third reason is that stressing hunger is in keeping with Congressional mandates, and it is in sync with public policy over the past 30 years. Historically, Congress and federal agencies have focused on hunger and not on food security. In creating and authorizing federal food and nutrition programs, Congress explicitly mandates those programs to prevent hunger or ameliorate poor nutritional status. Both Congress and the public have waited quite a while for the policy and academic communities to come forward to develop a baseline measure that will help us rationalize, debate, discuss, and progress in terms of resolving hunger.

For three decades, public policy has linked hunger, the inability to purchase a nutritionally adequate diet, with poverty. Indeed, as most of you know, the poverty standard is based on the cost of such a diet. To broaden the concept of hunger by intertwining it now with the new concept of food security variables could be disruptive to the policy process as well as to evaluating the effectiveness of programs.

As the work of Radimer and her colleagues and Leidenfrost made clear, there is a surprisingly commonly used definition of hunger in the scientific and policy communities. Look, for example, at the definition used by the American Academy of Pediatrics, Tufts, Harvard, Cornell (meaning Radimer's two articles), the Urban Institute, the American Society for Clinical Nutrition, and the American Institute of Nutrition. This history and consensus should be built on and not disrupted.

So, for these reasons, ladies and gentlemen, an annual report of a baseline hunger measure is the essential goal for us. The research community can and should continue to develop the concept of food security, which is broader in nature and for somewhat different purposes, and ultimately it will make a major contribution in the policy process. But a measure of hunger is the more compelling and policy relevant task for us, today and tomorrow.

Thank you.

WILLIAM DIETZ: Good afternoon, and thanks again to the organizers for inviting me. I agree with this entire panel that this has been an outstanding conference and one which is seminal in this particular field.

I am here as both an eccentric and a heretic. Eccentric because I don't do research in this area, and heretical because I am a clinician rather than a social scientist, as was Jean Mayer, whose work has provided some of the impetus to this conference.

I would like to begin by addressing two comments that have been made, the most recent of which is Larry Brown's. I think that Larry is quite right that hunger as a policy issue carries a lot of weight. But I don't consider legislators ineducable, in contrast perhaps to what some of their behavior and performance would suggest. It is time to begin broadening the definition of hunger to address food insecurity. I would hate to have a measure of hunger introduced in surveys that demonstrated that the prevalence of hunger has declined, only to be accompanied by an increase in the prevalence of food insecurity, which would suggest that the problem has not been adequately addressed by whatever measures were used to reduce the prevalence of hunger.

Secondly, I would hope the emphasis on hunger that has preoccupied this conference will not obscure the equally important considerations for the design of the surveys intended to measure hunger. I too was struck, as was Marion, by the relatively constant prevalence of 4 percent of hunger in the surveys that have been conducted since 1977, despite the significant changes in the use of emergency facilities to obtain food. That doesn't suggest that we need a better measure. I would contend that suggests that we need to pay more attention to the design of the survey, and particularly to what is perhaps a systematic bias in those surveys, to detect those who are truly hungry.

I would be interested—Cliff Johnson and others are here from NCHS—to know who are those 14 percent who don't respond to the interview, or the 25 percent who don't respond to the

physical examination. Do we have enough information about those people to be able to say that they are not more at risk for the kinds of measures that we're using? I know we have demographics on them, but I don't know whether the demography will adequately address whether they are the same or not.

Finally, I would also like to echo a comment that was made earlier about the importance of tying the measures of hunger and food insecurity to clinical outcome measures. This is where I will put on my heretical hat, because I think that it may be no coincidence that hunger and obesity occur with an increased prevalence in the same populations. It is paradoxical, because on the one hand, hunger suggests food insufficiency and obesity suggests energy excess. Although it is entirely possible that different social, environmental, or even physiologic mechanisms may independently cause both problems, an alternative possibility is that the two are causally related.

This was brought home to me by the case of a 7-year-old girl whom I saw in our weight control program. I will call her Abby, although that is not her real name. She came to my clinic about a year ago and weighed about 220 percent of her ideal weight at age 7. She was about 180 pounds. Her mother was also obese, as was her father. Her mother was a single parent. There was a very strong history of diabetes in this family, and she had some of the early signs of diabetes, so she was a very high-risk child.

As I said, her mother was a single parent and dependent on welfare for her support. Over time, as I came to know this family better, it became apparent that this family was short of food. It was a classic example of the periodic shortage of resources that Dr. Tarasuk mentioned. The first check of the month went for rent, so this family had no resources by the middle of the month and were invariably hungry, or at least food insecure. At those times, the mother would fix large meals, often beans and franks, which were inexpensive, or use extra oil in her cooking to stave off her daughter's hunger.

When we identified these as potential problems that interfered with her daughter's ability to lose weight, she was able to address those by continuing to feed the same bulk but removing the fat, and her daughter began to lose weight.

At least two possibilities could explain this association. The most obvious is that the choice of food that people make when they're hungry or when they are suffering from food insecurity, may directly relate to obesity. It would be of great interest to know, in these individual populations that Dr. Fitchen mentioned, about whether those core foods for each ethnic group were also high in fat. In this family, another frequent food was chicken wings, which are inexpensive but loaded with fat and contain very little protein.

The second possibility is that episodic exposure to hunger may physiologically increase body fat. There is a growing literature on what is called cyclical dieting, which occurs in obese populations and also normal-weight individuals, predominantly women. The initial feeling was

that, at least in humans, cyclical dieting was associated with increased morbidity and perhaps mortality. Animal studies were also conducted to determine whether there were adaptations in metabolic rate, or rates of weight loss and weight regain, that made it harder for them to lose weight and made the possibility of weight regain more rapid.

I reviewed some of those studies. When you fast and refeed an animal, the animal's weight immediately returns to control level. In humans, interestingly enough, there have been fewer studies that have examined the effect of cyclical dieting on body weight. There are only two that I can find, both of them quite small samples. One, in normal-weight women, found that cyclical dieters had an increased body fat at the same weight as their controls or nonobese women—the cyclical dieters actually had increases in body fat.

The second group, which was an obese group of cyclical dieters compared with an obese group that was not a cyclical dieting group, showed that the cyclical dieters also had a markedly increased body weight. Now, this latter study doesn't exclude the possibility that women who are obese are going to diet cyclically or are more likely to do so. But it does suggest that this phenomenon may alter body composition substantially.

Now, it is true that food insecurity and hunger alone warrant the allocation of increased resources. If obesity is linked to hunger and food insecurity, it would suggest a paradoxical solution. That is, the solution to obesity in impoverished populations may be an increased food

supply.

Thank you.

BARBARA COHEN: Finally, the last person to speak today! I'm sure everybody is excited by what has been said, but also ready to take a break, as I am.

As many people at FNS who have worked with me know, in the past few years I have taken every opportunity I have had when working on a survey to try to inject yet another question on food security or on hunger. After using terms such as food sufficiency, adequate food supply, perceived inadequacy, or adequacy of the diet, you can imagine just how pleased I am to be here today, discussing food security and how we can develop a set of questions to incorporate into a national survey.

There are three points that I want to make today, and most of them are based on the experiences that I have had in developing the food-security measures and analyzing the results that were obtained from the food stamp cashout surveys. There were three surveys conducted, one in Washington State, which I and Nathan Young at the Urban Institute conducted, and two conducted by Mathematica Policy Research in Alabama and San Diego. Also, at the Urban Institute we conducted independently a survey on food security amongst the elderly.

Although much of what I'm going to say concurs with what has already been said today, I am also going to try to push you to expand your imaginations for a bit, and think a little bit about how we would use the data, perhaps not only on a national basis but on a community level as well.

My first and second points address two concerns to be considered when developing experiential measures on the individual or household level. That is, to consider the need to collect data relevant to the specific populations being studied, and to consider some of the factors that might influence peoples' answers to questions on their coping strategies or actions taken to avert hunger.

The third point focuses on the need to measure food security in a comprehensive way, using both experiential measures and resource measures at both the personal and the community level.

Often when we talk about hunger and food insecurity, we focus on families and children. Although there are many reasons to suspect that these populations are at greatest risk of going without food, we also need to make sure that we are including others in our measurements.

When I developed the survey questions for the Urban Institute study on food security among the elderly, I had to spend some time thinking about factors that could influence older peoples' abilities to get enough food and the specific actions they would take that are unique to that population. I tried to incorporate these into questions that have been used in the CCHIP and the NHANES surveys and on the cashout survey to study food security.

For example, when thinking about the elderly, some of the factors that are going to lead to food insecurity among the elderly certainly are not only driven by income but also can be driven by such factors as mobility, ability to cook for oneself, or ability to eat by oneself. In addition, seniors may first access community or congregate meals instead of accessing food stamps.

So when we're developing questions on food insecurity, we need to address some of these issues. We asked people about their physical limitations and abilities that related to procuring or preparing foods. In addition, we have to add to the question on coping strategies whether or not they went to a senior-meals program or got home-delivered meals as a result of not having enough food.

Not only do we need to think about seniors, but I think we also need to think about people who are living with physical disabilities who really have to rely on other people to get their food. Not only do we have to worry whether or not there is enough food available in the house, but also do the people living in the house have access to that food. Certainly we expect that children are going to depend on their parents but many elderly people also depend on other

relatives or friends to bring them food, prepare food for them, and perhaps just sit and eat with them.

We also need to think about cultural factors that might influence ways in which people get food or how they answer questions about coping strategies. For example, many cultures, especially among the immigrant populations, may not consider sharing extended family resources to be indicative of a problem. They may be sharing resources as other Americans are, but for them, that might be just their way of life.

This brings me to my second point: how to best measure alternative actions that are taken as a result of food insufficiency or food insecurity. The way we measured these strategies in both the cashout and the elderly surveys was to ask people if they had done any of the following because there wasn't enough food, and we presented them with a list of actions that we have seen here today: borrowing food, taking money out of savings, buying food on credit, working more, et cetera.

When we use such a list, the first thing we need to do is to make sure that the list is applicable to all populations. If we're going to develop one list for the whole population, we need to include all members of our population in it.

Second, we need to think about some of the limitations of this question. The question asks about strategies used specifically because there isn't enough food. Are interviewers asking and repeating to people that they are doing this because they don't have enough food? By the time you get halfway through the list, and especially the order in which we presented the list, individuals end up saying, "Sure, I'm buying less expensive foods," or "I am serving smaller meals," and maybe in their minds they have forgotten that they're doing it because they don't have enough food. So people are going to answer "yes" to taking certain actions even when it has nothing to do with not having enough food. This gives an inflated measure of food insecurity.

On the other hand, I think there are going to be people who are reticent to answer for themselves, or to admit to themselves as well as to others, that they are taking certain actions because of a lack of food. I have discussed this with others here; at what point are you aware that your actions are coping mechanisms as opposed to regular or natural behavior patterns. A woman might easily think, I've been wanting to lose weight so I'm going to eat less. When is she aware that the two things are happening simultaneously? She has less access to food, and she is choosing to eat less. So if individuals answer that they are not doing these things because of lack of food, we're going to have a deflated measure of food insecurity.

I don't really know how to allow for these biases, but it is something we need to consider. People at Mathematica have looked at these questions—Tom Fraker and Alan Sherm. They found that when they analyzed the food security measures from the Alabama and San Diego

cashout surveys, they did find a high degree of dependence among the food-security measures. We may be able to use this knowledge to better test the questions that we are using.

Now, I want to turn to my last point, which takes us away from just focusing on the individual and the household measures, and put some thought into considering how we want to use these measures and what else do we need to know to use the measures.

One of the greatest advantages of measuring food security instead of hunger, or instead of focusing only on the hunger aspect of it, is that it focuses on issues at the individual, the household, and the community levels. It emphasizes that we need to address the issue of hunger on all levels to explore what is happening to people within the context of their households and their communities. It guides us to look at each level of concern separately and then together, so that we can understand the interrelatedness of the issues and address them in this more comprehensive way.

Food security is based on the presence of certain resources, both at the community and at the household levels. As we have heard today, personal resources that might assure food security include available disposable income, means of transportation to get food, cooking and storage facilities, and food preparation and consumption capabilities. At the community level, we have talked about accessibility to food, which means commercial food stores, not just food pantries and emergency food supplies, and public transportation to get that food, availability of food in the stores, and the affordability of food, competitively priced foods.

Certainly, we know that there are many government and community policies that are going to affect the availability of community and individual and household resources, including policies that relate to foods and others that don't, such as welfare policies, taxes, zoning, and city and town regulations on housing and transportation. Anything that is going to affect peoples' ability to afford food and the availability of food to those people is going to be considered part of food security.

So, to measure food insecurity, we need first to document its presence among community members, which is what we have been spending much time talking about today, looking at the personal factors such as ability to prepare food, and the availability of food—I'm not going to go through the whole list again. And we need to look at the household level. Used alone, these experiential measures can be used to determine the presence of food security or food insecurity and perhaps the level of food security or food insecurity on a national, State, or local level.

But to get the full picture of food security, we need to include these measures that are going to be taken at the local level. We need to ask questions such as, are there stores close by? Are there public transportation systems in place so that people can get to supermarkets to get their food? Are stores in the community carrying competitively priced foods and foods that community members will buy and eat? These measures are important, and we know now that many communities don't have accessible public transit systems that are running from low-income

neighborhoods to supermarkets. People in low-income neighborhoods want to go to supermarkets. They don't want to depend on the convenience stores and local stores. Yet even if they go to supermarkets, they may not be able to buy in bulk, because they don't necessarily have the storage capacities in their homes. I think we need to keep looking at all of these things together.

If we were to combine those comprehensive measures, I think we could not only develop a measure documenting the presence of food security or insecurity, but also come up with some solutions. If a community were to measure food security on a personal or household level, and find that food insecurity is a major problem in their community, they could then measure the resources available in the community, and perhaps determine what resources are needed to improve the situation. Not only can they assume that food security has to be addressed through public food-assistance programs or through different income distribution, but they can also look at what the community itself can take on to make changes that might address the issues of food security or food insecurity.

To summarize, I think we need to expand the way we're thinking to include community measures and also make sure that the measures we're collecting on a personal level are applicable to the completely diverse population that exists in our country.

Thank you, and thanks so much for having this conference.

STEVE CARLSON: I really want to thank each of our speakers in this panel for the depth of their thought-provoking insights and the brevity with which they offered them. For a change today, we have a surplus of time available to actually engage in and allow some conversation and dialogue.

I think, given that surplus, I will first offer an opportunity to the members of the panel to offer any rejoinders or thoughts that have occurred to them, and if there are none, we will then turn to the audience.

CHERYL WEHLER: I think one of the points that was made by the panel was that we need to think about methodology so we don't need to think about the measures. Some people said we do need to think about the measures. I would say this. As a researcher, if you think that actual hunger has increased from 1977 to 1992, and you believe it is increasing because you see other signals that it is increasing, such as we have more people applying for food stamps, we have had a recession, and we have more people standing in line at soup kitchens and food pantries—but some measures have revealed a steady prevalence. In order for this to be a case of systematic bias, the systematic bias would have had to be a case of increasing every year that hunger increased.

I think this is a problem of our measure. It looks to me like it is too sensitive and not specific enough, and, therefore, we are missing the trend in hunger. Therefore, the measure is

critical. I'm not saying that we shouldn't think also about our survey methodology, but as researchers we owe it to policy makers, who I agree can learn new things, and to the American public, the taxpayers, and to hungry people, to do the very best we can to measure accurately the problem that we are trying to help deal with by intervening through public policy.

WILLIAM DIETZ: You're certainly more familiar with the measures than I am, and probably the surveys as well. But I would only point out that a measure is only as good as the survey in which you use it, so I think the two issues are inseparable. I'm not arguing that you shouldn't spend time refining the measure. But the competing explanation for the constant prevalence of hunger is that the survey is inadequate, and the fluctuations in the population that we know exist aren't being detected by the instrument, perhaps because of sampling bias—the bias could be systematic throughout and not increasing, and still affect that same undetectable prevalence.

MARION NESTLE: I don't want to come across as being nihilistic on hunger questions, because I don't feel nihilistic about them. My understanding of today's discussion is that there exists a significant difference of opinion about what constitutes the best measure of hunger. I hope that such differences will not prevent people from coming to a consensus about an acceptable measure that can be used by all interested parties.

This is a matter of pragmatics. We have an opportunity to insert these questions into existing surveys. Now is the time to do so. Even these legitimate discussions need to be set aside so that we do not miss this opportunity.

We would all like the questions to be as good as they possibly can be, but I do not believe they can ever be perfect. All of the different ways in which hunger questions have been approached have been valuable—each one has had its own validity. The ideal question is unlikely to be identified immediately, so some compromise is needed.

RONETTE BRIEFEL: I just want to make another point about the 4 percent prevalence figure that we have known, and which may or may not be the same over time. The number that I showed this morning was a prevalence figure for individuals based on the answer to the food-sufficiency question in the NHANES III family questionnaire. If we would add to that the individual hunger questions, it probably goes up to 5 or 6 percent.

So, we need to be very careful about the 4 percent figure, whether it is 4 percent of households from a household-based survey or 4 percent of individuals from an individual-based survey. We have not sorted out in NHANES III the best mix of the family variable with the individual variables, but we certainly want to produce individual-level statistics. Therefore, this number of 4 percent is an underestimate of the reported problem in individuals.

To get to Dr. Dietz's question about response rates, the reason we did not show any data by age is that we do have a lower response rate in the elderly, and we don't want to give out any

figures until we really look at the nonresponse, because preliminary NHANES data suggest that the frail elderly do not participate as much as the healthy elderly in the survey. Therefore, we really need to look at that carefully.

EDWARD FRONGILLO, JR.: I have a question about the purpose of the data collection. A number of you on the panel suggested that the primary use in the policy arena of the kind of information that might be collected from the CPS survey and other surveys is to monitor how things change over time, which is a very different purpose from trying to quantify or assess the severity at a particular time, because that number in itself is meaningful.

I would ask any of you here to try to help me and everybody here to clarify exactly what you think our purpose is, for those of you who are more knowledgeable than I am about what is meaningful in the policy arena. I think Marion is right, if the purpose is to monitor changes over time, there is less concern about what the measure is, as long as it can be sustainable over time. On the other hand, if it is a point estimate at a particular time, because the number itself, whatever that percent comes out to be, is very important, it dictates very different kinds of concerns.

LYNN PARKER: Not being a researcher per se, I would speak more as a policy advocate in Washington. I think both of those things are useful. Looking at things over time and, at some point, prevalence over time, is very useful. The issue of severity is important to policy makers. If there is some way to measure things over time and to deal with the issue of severity along with that, that would be useful.

But what is coming up politically is that we have less and less money and, to some extent, more and more problems. We're dealing with major changes like welfare reform that may have an impact on hunger, on food insecurity, and it would be extremely useful to have some kind of a measure that is there over time. Although we obviously are not going to be able to say, this is because of welfare reform, but at least as we're decreasing programs or consolidating or dropping people off as we may be doing over the next few years, we can see what is happening to people on a national level. We will have some way of knowing that people have agreed on something as a meaningful measure and, with that, we will be able to see what is happening over time.

To me, that is the most important thing from a policy perspective immediately. Longer term, in developing program and policy, it is absolutely necessary to look at all the other kinds of issues we have discussed today. I wouldn't argue that we should not also include looking at those issues. It is just that, in a very immediate sense, we need to be able to monitor something bad that is happening to avoid more bad things from happening and to help good things happen.

LARRY BROWN: Ed, if I understand your question, my answer would be that we want both. That is, we want prevalence over time, but we also want to know at a given moment. So, thinking of it the way epidemiologists do, I don't think we're uninterested in either one—it's a

tradeoff between incidence and prevalence. I think that we can create a vehicle in which we can get both. I'm not particularly worried about that.

JANET POPPENDIECK: I'm Janet Poppendieck. I just want to pick up on this over-time data thing, because I think if you're placing something in the Current Population Survey, most of us experience those data as mainly useful in their measurement of changes over time. You open the CPS to see how we're doing on poverty, and the first paragraph tells you how it compares with the previous year. Anybody who has participated in the endless discussions of how rotten the poverty measure really is as a measure of true misery and suffering and exclusion from the mainstream of American life knows that the main usefulness of the poverty threshold is the over-time comparison.

So, if that is the target for this set of questions, I think you should keep that in mind. That doesn't keep us from doing the other kind of more detailed community-level studies and the kinds of things that would measure what hunger is doing to people and how they get into those situations.

STEVE CARLSON: If I could take the liberty of reacting to that, I think we at FNS—and I will speak for NCHS as well, who I think will concur entirely—we have spoken quite a lot about our plans to try to incorporate a set of questions in the Current Population Survey. But a more complete statement of our objectives would be to come up with a standard set of questions that could be incorporated into any of a variety of survey vehicles, both at the Federal level and at State and local levels, the value of which would be some standardization across all of those. The CPS is on the immediate horizon, but it is not only the CPS that is in sight.

CHRISTINE OLSON: From the work that we have done, I can believe that, for instance, some of the low-income women that we spoke with, when faced with a food-sufficiency question would interpret "enough" in a very narrow sense. Even though their personal life circumstances were deteriorating as time passed, they would answer that particular question the same way year after year, and they would say they had enough. Even though when we talked to them and we looked at their situations, we would say the food they had isn't enough.

I say that to support two general directions. One is the need to look at food insecurity, this broader picture, because I think if we ask those women questions in that broader sphere about anxiety and those kinds of things, we pick up changes over time. They would say, yes, I am more anxious than I was last year. My husband has now lost his job. The industry has moved out of town. Unemployment in our community has gone to 35 percent.

That leads to Barbara's point, which I would like to reinforce. To me, the greatest advantage of a food-insecurity kind of measure, it will allow us to link conceptually across individual, household, community and even higher units of social organization. Some of the things that are causing hunger are community-level change. We probably—if we're looking at

these communities in the right way and measuring the right kinds of things—we're going to be able to see those linkages.

SUZANNE JAFFE: My name is Suzanne Jaffe from Cornell University. As Lynn Parker has said, I think you are interested in measuring it when bad things are occurring, and you are also interested in measuring the effect of the good things that can be done. I think the bad thing that you want to avoid is worsening hunger. I think the good thing we want to see is building food security. To be able to know and measure these, you've got to measure food security, I believe, and also have an idea of what to measure. I think maybe we also need to have an idea of what are the possible solutions that we politically are willing to do and that we have the resources to do. Then we have an idea of what kind of measure will help enable us to put action into these solutions.

DAVID CHATMAN: I'm David Chatman of Aspen Systems. Regarding the issue of measuring change versus measuring absolute level at a point in time, in terms of the basic measure that is chosen, there really isn't that much difference in the overall objectives. It is true that to get a good measure of change, you wouldn't have to necessarily have a good measure of level, but they would have to be highly correlated, so the measure of level was always, for example, 3 percent high or 4 percent low or something of that nature. The best way to get a measure that is highly correlated with what you're trying to measure is to measure it accurately in the first place.

The main impact here is in terms of the sampling design. That is, if change is very important, then that has implications on how you might want to overlap the sample. For example, CPS is an overlapped rotating sample. It also might have implications on how large a sample you would need to measure change accurately. Typically, change is harder to measure accurately than is the absolute level. But in terms of the basic measure you're going after, I think the goals are really the same.

LYNN PARKER: I have two thoughts in response to some of the things people have been saying. One is, I think there is a certain level of concern on the part of a lot of the antihunger advocacy community about whether politicians are going to be concerned that people are worried about their food supply. When you look at the current recommendations that are out there for legislation, you see a lot of legislation that clearly shows no concern about worry or anxiety, major cuts in housing, major cuts in food assistance programs, and so forth, changes in welfare reform that people are discussing now. They are saying there are going to be costs, people are going to suffer. That is a given.

So, I would guess I would add here that some of our concern comes from a reading of the political environment and a fear that unless we have something that we can separate out as hunger, that policy makers see as something that legitimately they are worried about, we're going to be hobbled. Perhaps what we can talk about is that there will be sufficient questions about hunger so that we can separate that out, but that we can begin hopefully a humanizing process

and a political process at the community level, as we have over the last few years, raising awareness about hunger, having the community talk to politicians about anxiety and all the things that Janet Fitchen talked about, what that does to the family, the child abuse, the harm to the marriage, the impact on the family of those problems. So, I think that is where we're coming from.

The other thing about the community research, I think it would be marvelous if researchers here and all over the country would begin to work with children's groups, children and youth societies, community government, whatever it is, to do exactly what you're talking about, to do some of this community-based research on food security, to look at creating—we talked about hunger-free environments a few years ago, but food-secure environments. What is it going to take at the community level? How can we deal with the grocery store issue? How can we take full advantage of the Federal research, the State research? How can we put it all together to really make a difference in those communities?

I feel almost as if we have all been in our caves for the last decade, and we're coming out and seeing the sunlight, like the groundhog, and maybe not seeing the shadow, and beginning to see that we can begin again to see this issue on many different levels.

When I talk about a national thing over time, I am not saying that the community research

can find out the kind of community that they are from, from some source like the 10-year census?

STEVE CARLSON: I'm looking at my staff, Bruce Klein, who used to work with that. I think the answer is, yes, it is possible. I don't know exactly what kind of constraints or limitations the Census Bureau would put on that. They are much concerned about issues of disclosure and confidentiality. But it is plausible.

LINDA NEUHAUSER: Linda Neuhauser. Regarding the 4 percent question again, I'm wondering if it might be possible to do some validity checking on that—it might not be that hard. You could ask the question in the formal way that it is asked with the rest of the survey, and then you could go back to the same people, a subsample of them, and use, say, the Radimer questions or the CCHIP questions, and include the food-insufficiency question among them and see if you get different answers. Because if the 4 percent is really 8 percent or 12 percent or 1 percent, then we have a big problem. So that would be my suggestion.

One other thing that has always concerned me is whether a formal government survey is an effective way to get at the sensitive issue of hunger. It might be like asking a literacy question on such a survey. You know people are not going to answer it correctly. So as much as we need this, we may find that we are somewhat hampered in getting the information we want.

JOHN COOK: I want to reread the quote that Christine Olson displayed earlier from some of their earlier work. "'Going hungry, hungry' is when there is absolutely nothing in the house, but also, 'going hungry' is when you have to eat the same thing all week long and you have no variation from it, and you know sooner or later you're going to run out of that, too," and it goes on.

My question is, for the person who said that, or anyone who would say anything like that, at the point at which they move either from going hungry hungry to being hungry or from being hungry to being hungry hungry, what has changed for that person? What has changed in that person's life and in that person's consciousness? How has that person's situation and that person's understanding of it changed? That is a question for anyone who wants to take a shot at it.

CHRISTINE OLSON: I may not have heard your question correctly, so if I go down a wrong path, stop me. It seemed to me that 'hungry hungry' was based primarily on quantity of food available. People who talked about being 'hungry hungry,' made it clear that they meant there was nothing. "We had nothing to eat for 3 or 4 days. There was just nothing in the house that I could feed to my kids." Then also, when they talked about that, they usually mentioned the hunger pangs, the physical sensation of hunger. That is what distinguished that more severe state in people's minds from this situation that was not good, that was clearly viewed as problematic, wrong, but was less severe. We heard people talk about this as wrong in a country like the United States. But it wasn't as strong as the quantitative, "no food was there." At this

less severe stage, it was more like: "At the household level, we struggled with supply. There were some things, but it wasn't what we should be eating, and we ate the same thing day after day. I worried about it because I knew I was going to have to do all this stretching, and I couldn't see the end." As I said before, this is consistent with the idea of food insecurity.

Does that help?

JOHN COOK: That does help, Christine. My question then is, is that a real demarcation? Is that a real distinction? Or is that an artificial conceptual distinction that we are imposing on it to help us understand better what is happening?

CHRISTINE OLSON: That is not artificial. It comes out from the words themselves that the women were using—the women were making those distinctions, we didn't impose them.

JOHN COOK: I think I may have misstated my question. Not that it is artificial in the way that you created it, but for the people experiencing that, is there a sharp demarcation? Is there a point at which their situation noticeably changes and at which they recognize that now we have moved from hunger to food insecurity? Will they continue to conceptualize their own situation as one in which they still are experiencing hunger, more on a continuum?

I don't argue with the quantitative distinction versus the qualitative. What I am trying to get at is the perspective of a person who is experiencing this, as his or her circumstances change over a continuum, where you or I might draw the demarcation. Is that a recognizable change in the person's life situation for them? In the language that they normally use, can they differentiate it?

CHRISTINE OLSON: Yes, I believe they clearly could. "No food in the house" is more complicated to measure than it appears. What is "no food in the house"? Some people still have a couple of pounds of flour left, and that is not literally, "no food in the house."

Typically, in a small number of situations there literally was no food in the house, but in other situations, there may have been a bag of flour. But "there was no food in the house to put together a meal for my family." That is a problematic situation. In our followup work we're doing food inventories, and we do know exactly what food they have in the house.

JANET FITCHEN: I wanted to say that a lot of this is relative. In the last year, when I have been doing life histories on people who are now calling themselves poor because somebody has defined them as poor and eligible for some program, I asked them to reflect back at the time they were in high school, did they consider themselves poor. At the time they were in elementary school, would their family have been considered poor, and so forth. I have had some rather astonishing answers from people who say, "we are poor now, and I ask," were you poor then—and that might be 50 years ago—and they say, "we were a family of sharecroppers and we had 13 kids, but we weren't really poor then the way we're poor now."

I think people do have a conceptualization that the definition has shifted socially and their understanding of their own situation has changed. But I think also in terms of the difference between 'hungry hungry' versus 'hungry' as it is in people's minds. I also have seen this in a lot of places, and the sense of relief when we are over the worst of the hunger, and we can maybe put a little something together. But 'hungry hungry' is when we send the kids to bed without food.

I think that it is a real distinction that people do make.

BARBARA COHEN: I think we need to think about the words we're using. Although we're talking about food, let's forget food for a second and talk about security. When we think about any kind of security, whether it be personal security or job security—we think of it as a continuum. There is not just one point when you are insecure, although there may be extremes, such as crises, when you feel your insecurity sharply. For example, you lack job security when your boss lets you know you may be let go soon. When you lose your job, you're not only job-insecure, you are jobless. This is the crisis point in the continuum of job insecurity. When you have no food in your house, you are not only food-insecure, you are at a crisis point in the continuum of food insecurity and you probably are hungry if you are completely without food. Even if you have just a bag of flour, if you don't perceive that as something you can turn into a meal for your family, then in all respects you are without a meal for your family, you are in a food-security crisis.

So, I think we have to decide, are we interested in measuring the crisis only, or are we interested in measuring the whole continuum. Do we want to know if people are anywhere along the continuum, or should we pick certain points that we think are important to measure.

JAY HIRSCHMAN: Jay Hirschman at the Food and Nutrition Service. Barbara, this is a question for you. You have had recent direct experience in using a food-security hunger-type measure associated with an evaluation related to cashout of the Food Stamp Program, a major change in a major food-assistance program in the United States.

A lot of the discussion today has been focused on the measurement relating to what might feed into a CPS module, and that discussion is going to continue. But could you address some of the potential pitfalls and the differences—you and the other panel members—of the development of a module to use in a CPS context, versus one that might be used in a program evaluation context? Things that we need to look out for, not just stopping when we have a CPS module developed, perhaps.

BARBARA COHEN: Honestly, I'm not familiar enough with the CPS to know exactly how that survey is put together, what is included on it, and what is not. To familiarize you with the cashout survey—it was built basically on an NFCS-style survey where there was a complete food focus. There was a household income and expenditure and consumption focus, but there was also a food focus. The complete NFCS household food-consumption questions were asked,

which was a tedious 3-hour process. Prior to that tedious 3-hour process, we asked some food-security questions.

I think that there is merit to asking questions about food security in the context of a survey that focuses on food and nutrition. People may be more likely to think along those lines and perhaps that would make it a more reliable or valid survey to use.

But I honestly don't know enough about CPS to say anything about what the pitfalls could be.

TOM FRAKER: To respond to your question, Jay, or to elaborate on Barbara's response, Mathematica was involved in evaluating the cashout studies in San Diego and Alabama. I think there is a distinction to draw between a program evaluation in a very specific site versus a nationwide survey such as CPS. Let's take the case in San Diego County. We were looking at recipients of cash food assistance versus food stamp coupons, but they were all in the same county. Living in the same community, they all had access to the same community organizations.

So with questions such as, "Did you obtain food from a food bank" or "Did you eat a meal at a soup kitchen" the comparisons of the incidence of the use of these community organizations between the cash recipients and the coupon recipients were valid. Because they were living in the same county, they had equal access to these programs. But in the CPS, where it is a nationwide survey, I think these questions would have a lot less validity if we were trying to make regional comparisons or urban-rural comparisons. So I think we need to be sensitive to that distinction.

BARBARA COHEN: I agree with that. We may not think there is anything surprising about a person living in a rural area to travel 10 miles to a supermarket, while it may be strange to think of a person in the inner city traveling that distance. For a local program evaluation to get adequate information, we have to look at both community and personal resources. In the cashout surveys, we didn't really know where the food banks were, or how close the stores were. We only know what people told us, so we don't really have a way of knowing whether the answers we got indicate community problems or personal resource problems.

STEVE CARLSON: Let me exercise the power of the Chair and entertain one more question, and then we'll announce the reward for the day.

MARGARET ANDREWS: Margaret Andrews from FNS. As a member of the organizing committee, I have been involved today in cutting off the discussion, so I wanted to grab this last opportunity to open up the discussion again. In particular, the last panel session ended with a very provocative presentation by Dave Smallwood about a new measure of food insecurity being the difference between actual food spending and the respondent's perception of their minimum needed food spending. I wanted to address to the panel the question of what their reaction was to this suggestion, and to the audience as well.

Since Marion Nestle said that it didn't matter what measure, I thought I would address it to her first.

MARION NESTLE: I think it is a great measure. I think all of the measures are great measures. You can't use them all. You're going to have to make some decisions. But pick one.

CHRISTINE OLSON: One of the questions I would raise about that, and I would be interested in Janet Fitchen's reaction to this, is that in some communities, the barter system is used with very little cash. There is some cash to it, but there is a fair amount of trading food back and forth, growing food—in rural areas in upstate New York that is happening. I don't know how you would take that into account. I think that actually in some low-income communities it might be more prevalent than we think it is. I don't know that we know for sure how prevalent it is, but my hunch is, it might be more prevalent than we think.

LYNN PARKER: I am just remembering back to when we released our national CCHIP study, and people made fun of some of the questions. Like the question about having to depend on a small number of foods at the end of the month, and a lot of snide comments by conservative columnists about how they couldn't have what they wanted at the end of the month—big deal, sometimes I can't have what I want, either. I'm wondering whether the same kind of reaction would come if they said, so they want to spend such-and-such, well, we all want to spend something. What does it really matter, what anybody wants to spend?

I would like to think about it more, because I think it is interesting. I think Dr. Smallwood always has really interesting ideas. But my first reaction is that I just wonder how that would be received in a policy context. But that's not a final reaction.

JOHN COOK: I would just point out that that kind of measure would address the question raised earlier regarding achieving similarity between the way the poverty thresholds are used, for example, 150, 185, and so forth percent of the poverty threshold. If there were a hunger threshold, then we would be able to make that kind of comparison. I'm not real sanguine about accomplishing the creation of a hunger threshold, but stranger things have happened. So who knows, maybe we will.

CHERYL WEHLER: In several of our sites, we did not always find a strong association between how much a household spent on food and the CCHIP indicator of hunger. We theorized that it had to do with the elasticity of food expenditure. But I don't want to argue with an economist about that.

I guess I would agree with Lynn. I would have to do a lot of thinking before I would say that that would be a one-item measure of hunger that I would want to adopt. The other thing that I heard was something about understanding program participation. We see that the hungrier families are, the more likely they are to be participating in multiple programs. So it is not what you would expect, that if they were participating in multiple programs it would actually decrease

their hunger. I don't know if it is because of the program, the level of benefits in the program isn't getting them to a certain level of income security that they are no longer hungry, or what.

There is another thing that I would really be careful about. With CCHIP, we have three other collaborative projects going on where we are looking at the relationship between children's hunger and other outcome measures like psychosocial and cognitive development. I think we have to be careful about choosing a single-item measure that doesn't allow us to make any connection about negative outcomes for an individual, because it is a household-based measure and there is differential allocation within a household.

So, I want to caution that if we're going to rely on a single item, to be very careful that it is not just economic, because I'm worried that if we get too far away from the medical model, we will have no predictive value. So when a Congressman wants to understand the implications, there isn't a link to children who don't do so well in school or whose health is affected. There is no way to be able to look at that kind of implication.

STEVE CARLSON: Thanks. No, David, I said that was the last word, and I mean it. But there is salvation for you, there is an opportunity. Let me pass that on. But before doing that, let me offer one last round of thanks to the food security research team within FNS and to the members of the interagency working group in USDA and HHS who got us here today. My thanks to all the panel members and speakers who spent their time and energy in not entirely pleasant weather conditions to share their insights and thoughts with us, and thanks to all of you for sticking with us for a very long, but I hope productive and thought-provoking day.

In exchange for all of that, I have the pleasure to announce that there will be an opportunity for continued conversation and discussion in a somewhat more relaxed atmosphere in the Sky Room of this hotel, which is on the top floor. You can get there by turning left out of the exit and heading for the elevators and going to the very top of the hotel. There will be a cash bar available, and we hope that you will join us and continue the conversation.

Thanks again very much for joining us.

(The meeting was adjourned at 5:29 p.m.)

APPENDICES

Appendix A:

**Technical Papers on Issues Concerning the Scaled Measurement of
Resource-Constrained Hunger and Food Insecurity from Household
Population Survey Data**

Appendix B:

**Conference Agenda
January 21, 1994
Hotel Washington
Washington, D.C.**

Speakers List

Participants List

APPENDIX A

Technical Papers on Issues Concerning the Scaled Measurement of Resource-Constrained Hunger and Food Insecurity from Household Population Survey Data

1. Jennifer J. Anderson, et al.: "Scaling and Indexing to Measure the Severity of Food Insecurity and Hunger" (March, 1994).
2. Christine M. Olson, et al.: "Validation of Measures for Estimating the Prevalence of Hunger and Food Insecurity in the Current Population Survey Module: A Combination of Cornell and CCHIP Items" (June, 1994).
3. Richard Ira Scott, et al.: "Measurement of Coping Behaviors as an Aspect of Food Insecurity" (November, 1994).
4. Cheryl A. Wehler, et al.: "Development and Testing Process of the Community Childhood Hunger Identification Project Scaled Hunger Measure and its Application for a General Population Survey" (November, 1994).

INTRODUCTION

In order to follow up on technical issues raised in the conference, FCS commissioned the additional analyses presented here. These analyses are based upon two recently developed independent data sets of comprehensive hunger and food-insecurity indicator items. One set was developed by the Cornell University Division of Nutritional Sciences research group headed by Dr. Christine Olson and including Dr. Anne Kendall, and Dr. Edward Frongillo, Jr. It draws upon a 1993 one-county population sample of approximately 200 households in New York State. It includes an expanded and refined set of the Cornell/Radimer hunger and food-security items, a selected set of CCHIP-type hunger and food-coping items, and the NHANES version of the basic household food-sufficiency question.

The second of these data sets was developed by the Community Childhood Hunger Identification Project (CCHIP) research team headed by Cheryl Wehler and including Dr. Richard Scott and Dr. Jennifer Anderson. It includes data from about 2,200 low-income households sampled in five diverse sites in 1992-93. It includes the full CCHIP survey instrument, a selected subset of Cornell/Radimer-type items, and the NHANES version of the household food-sufficiency question.

These two data sets, while independent, contain numerous elements in common, as well as complementary versions of indicators for some other dimensions of food insecurity within the household. Taken together, they cover most of the types of indicators that FCS has examined with the objective of creating a composite state-of-the-art hunger and food-security survey instrument. Together, they encompass most of the domain of the resource-constrained food insecurity and hunger concepts that FCS is seeking to operationalize for a national population sample. Both have been extensively field tested and refined.

Each of the research teams, working independently with its own data set, was asked by FCS to provide additional documentation, clarification, and elaboration of the analyses they had presented at the January, 1994, Washington, D.C. research conference. Each was asked to provide detailed explanation of analytic results, including factor analyses, reliability testing, Guttman scaling, and any other analyses they had made of alternative experimental scale measures drawn from the full set(s) of potential variables available in their respective extant data sets.

Each group was asked to work in the context of FCS' need to select a single, coherent and comprehensive set of specific questionnaire items for use in the April, 1995, Current Population Survey. The aim is that this item-set should draw upon the full range of survey items, experience, and analyses presently available; it should cover, to the extent feasible from a household survey, the full domain of the hunger and food-security concepts; and it should accurately reflect the current state of technical and scientific knowledge in this area.

Each team was also asked to address itself to FCS' chief objective at this stage: to obtain an adequate national data set of scalable indicator items from which valid and reliable scaled measurement can be made of the observable conditions of resource-constrained hunger and food-insecurity among U.S. households. That is, the CPS data should provide an adequate set of candidate items from which stable measurement scales can be constructed, and the prevalence of hunger and food insecurity reliably determined, for the varying levels of severity with which those conditions are experienced and observed. At a minimum, the prevalence of food insecurity and hunger within U.S. households needs to be distinguished at three separate levels of severity: (1) food-insecurity conditions short of actual resource-constrained hunger within the household; (2) food insecurity severe enough that indicators appear of actual resource-constrained hunger, for at least some household members, at least some of the time; and (3) severe household hunger, identified when indicators appear of children's hunger within the household and/or of adult hunger at some predefined level of severity (e.g., adults going whole days with no food; other adult hunger indicators showing positive for more than a few days during the month).

The papers included here present the results of the two research teams' post-conference efforts to more fully address these issues and objectives.

SCALING AND INDEXING TO MEASURE
THE SEVERITY OF FOOD INSECURITY & HUNGER

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March 1994

*The Community Childhood Hunger Identification Project is a project of Food Research and Action Center, Washington, DC.

Introduction

When measured in a population survey the concepts of household hunger, and more broadly, food insecurity are generally thought to be more complex than can be captured adequately by a single item, encompassing as they do both perceptions and behaviors of various members of a household who each have different experiences and roles within that household. In this situation, as in others where complex social constructs are to be developed, one must identify a set of items that cover the dimensions of the construct. If it is indeed a single construct and the items are scalable then the phenomenon may still be represented by a summary score -- either a numerical scale or an index that indicates the intensity of the condition (i.e., severity). An example of this is the CCHIP hunger score which ranges from 0 to 8, being a count of the number of hunger problem areas that a household experiences. Alternatively it could be a category, as defined by the CCHIP hunger categories "at risk of hunger" (corresponding to hunger scores 1 to 4, and "hungry" (corresponding to scores 5 to 8).

There are several ways to examine the scalability of potential scale components. The three analytic approaches most often used are factor analysis, Guttman scaling and reliability analysis.

Factor analysis is well suited to detecting whether there is more

than one dimension represented in a set of items. Guttman scaling assesses whether the items under consideration form a single,

Cronbach's alpha coefficient, detects whether individual items belong in the scale.

Several examples follow, using data from five recent CCHIP surveys, that illustrate the process of developing a scaled hunger measure. The first shows the procedure employed to define the CCHIP hunger score and categories, for use in studying hunger in low income households with children under 12 years of age. The second shows one way in which a hunger scale could be constructed for a household that includes adults only. The third shows another way of constructing an adults-only measure, one that is strongly ordered, defining several levels of hunger.

Example 1: Development of the CCHIP hunger scale

This example illustrates the use of each scaling technique. There are eight questions in this scale, all yes/no items, identified in Table 1. Two of the items pertain to the entire household (H1, H2), two others refer to adults (A1, A2), and the remaining four ask about children's experience of hunger (C1-C4).

Table 2 shows the factor analysis of these eight variables. The first factor explains just over 50% of the total variance (4.046/8) and all eight variables load strongly on it. All have factor loadings exceeding 0.50, and this is adequate, although it is preferable for factor loadings to exceed 0.60. There is also a second factor with an eigenvalue greater than 1.0 ,i.e., explaining more than a random share of the variance. In this

TABLE 1

OCHIP HUNGER ITEMS

- H1 Household ever rely on "emergency foods"
- H2 Ever run out of money for food
- A1 Adults ever cut the size of or skip meals
- A2 Adults ever eat less than they feel they should
- C1 Children ever eat less than they should
- C2 Children ever cut the size of or skip meals
- C3 Children ever report hunger
- C4 Children go to bed hungry

TABLE 2

FACTOR ANALYSIS OF CCHIP HUNGER QUESTIONS (N=2204 OBSERVATIONS)

Initial Factor Method: Principal Components
 Two factors were retained. Third and subsequent eigenvalues were
 0.66 and lower.

Factor Pattern

	<u>FACTOR1</u>	<u>FACTOR2</u>
H1	0.59124	0.46346
H2	0.65180	0.39528
A1	0.77719	0.38615
A2	0.76639	0.37480
C1	0.79311	-0.37780
C2	0.76874	-0.38320
C3	0.75494	-0.35723
C4	0.53890	-0.47339

Variance explained by each factor

<u>FACTOR1</u>	<u>FACTOR2</u>
4.05	1.30

Varimax rotated pattern

	<u>FACTOR1</u>	<u>FACTOR2</u>
H1	0.09246	0.74553
H2	0.18348	0.73988
A1	0.27883	0.82182
A2	0.27917	0.80616
C1	0.82879	0.29133
C2	0.81531	0.27032
C3	0.78721	0.27901
C4	0.71592	0.04430

Variance explained by each factor

<u>FACTOR1</u>	<u>FACTOR2</u>
2.68	2.67

case the second factor, with an eigenvalue of 1.30, explains 16% of the variance (1.3019/8). This suggests that there are perhaps two dimensions here. Orthogonal rotation of the factor space makes it easier to see where these different dimensions might be. In the lower portion of Table 2 one can clearly see a strong loading of the child and adult/household questions on separate factors following varimax rotation. One should, however, not make factor analysis the only arbiter of scale membership.

Table 3 depicts reliability and Guttman Analyses of CCHIP hunger questions. In the lower part of Table 3, the Guttman analysis indicates that the eight items can be considered together as an ordered scale. The coefficient of reproducibility (CR) is the proportion of items that would be correctly predicted from a knowledge of the number of each respondent's items. A value of 0.9 or higher corresponds to good Guttman properties. Note that the $CR = .926$, i.e., in 92.6% of cases a count of the number of yes answers, which can range from 0 to 8, tells one exactly which of the items were answered positively when they are ordered as H1 H2 A1 A2 C1 C2 C3 C4. This item order corresponds to decreasing overall sample prevalence. The coefficient of scalability (CS) is a measure of the difference between the observed reproducibility and that expected due to chance alone, formally, the proportion of all possible improvement relative to the minimum marginal reproducibility (MMR) that is produced by the particular scaling pattern, i.e., $CS = (CR - MMR)/(1 - MMR)$. The CS should exceed 60%, and one sees here that $(.926 - .721)/(1$

TABLE 3

RELIABILITY AND GUTTMAN ANALYSIS OF COHIP HUNGER QUESTIONS (N=2204)

RELIABILITY ANALYSIS

Cronbach Coefficient Alpha

for RAW variables: 0.852

for STANDARDIZED variables: 0.856

Standardized Variables

<u>Deleted Variable</u>	<u>Correlation with Total</u>	<u>Alpha</u>	<u>Label</u>
H1	0.481	0.853	HH Ever Rely on "Emergency Foods
H2	0.543	0.846	Ever Run Out of Money for Food
A1	0.679	0.830	HH Adults Ever Cut Size of or Skip Meals
A2	0.665	0.831	HH Adults Ever Eat < They Should
C1	0.694	0.828	Children Ever Eat < They Should
C2	0.662	0.832	Children Ever Cut Size of or Skip Meals
C3	0.653	0.833	Children Ever Report Hunger
C4	0.426	0.859	Children Ever Go To Bed Hungry

GUTTMAN ANALYSIS

Coefficient of Reproducibility	CR = 0.926
Minimum Marginal Reproducibility	MMR = 0.721
Coefficient of Scalability	CS = 0.733

- .721) = .733 or 73.3%. Even though two factors appear when varimax rotation is applied, the Guttman analysis provides strong evidence of a single, ordered construct.

This conclusion is corroborated by the alpha coefficients, both raw and standardized, shown in the upper part of Table 3. They are high (>0.80) for the eight items considered together. In this case, because all eight variables have the same measurement scale, there is no real difference between these two alpha coefficients. The alpha coefficient is the average inter-item correlation for the items in the scale, adjusted for the number of items, i.e., $\alpha = Np / (1 + p(N - 1))$, where p = mean inter-item correlation, and N = number of items (here $N = 8$). As each variable, in turn, is deleted from the scale there is no substantial increase in alpha, and so all eight items do belong in this scale.

Example 2: Development of a hunger scale for use in a survey of households without children (version 1)

This example explores the possibility of modifying the CCHIP hunger scale for use in households without children. Data for this exploration are from the same five CCHIP surveys used in example 1. In these surveys, hunger questions in addition to the CCHIP questions have been included. To the four CCHIP household and adult questions (H1,H2,A1,A2) are added the five seen in Table 4. They are USDAS (USDA item on perceived adequacy of food

eaten by the family), FDMNY1 (perceived adequacy of food money), RD (respondent ever not eat for a whole day), COPE1a1 (frequency of buying and serving less expensive foods), and COPE4a2 (frequency of not pay bills on time). Principal components factor analysis and its varimax rotation suggests two factors. This analysis also suggests that FDMNY1 does not load very well on either factor.

Table 5 presents the reliability analysis for this set of variables. In contrast with the alpha reliability analysis done for the original scale variables, these nine items do not form a single, coherent scale. Table 5 shows an overall alpha value of only 0.67 for the raw variables and 0.74 for the standardized versions. As illustrated in the table, the alpha coefficient is improved substantially from 0.74 to 0.84 by dropping the question on the perceived adequacy of food money.

Referring to Table 4, when the three variables that load on Factor 2 on rotation are omitted (H1, COPE4a2, COPE1a1), an improved scale is obtained. This is not surprising. While COPE4a2 and COPE1a1 are indicators of intrahousehold attempts to manage food resource insufficiency, they are not, strictly speaking, indicators of hunger. Hence, these four variables are deleted, leaving a five item scale.

Table 6 shows improved alpha coefficients for this scale. The USDA question (USDAS) is collapsed into two categories (always enough/sometimes or often not enough to eat) so that each of the five variables is given the same weight when 'yes' answers

TABLE 4

FACTOR ANALYSIS OF (N = 2204 OBSERVATIONS)

Initial Factor Method: Principal Components
 Two factors were retained. Third and subsequent eigenvalues were
 0.76 and lower.

Factor Pattern

	<u>FACTOR1</u>	<u>FACTOR2</u>
USDAS	0.77209	0.23107
FDMNY1	-0.53403	0.27698
A2	0.82005	0.20386
H1	0.69640	-0.29329
H2	0.71454	0.10957
COPE4a2	0.60155	-0.29815
A1	0.82909	0.15926
C1	0.54970	0.48387
COPE1a1	0.45353	-0.64028

Variance explained by each factor

<u>FACTOR1</u>	<u>FACTOR2</u>
4.11	1.03

Varimax rotated pattern

	<u>FACTOR1</u>	<u>FACTOR2</u>
USDAS	0.75290	0.28751
FDMNY1	-0.25447	-0.54511
A2	0.77433	0.33831
H1	0.37324	0.65703
H2	0.63321	0.34873
COPE4a2	0.29509	0.60306
A1	0.75431	0.37918
C1	0.73072	-0.04846
COPE1a1	-0.03081	0.78403

Variance explained by each factor

<u>FACTOR1</u>	<u>FACTOR2</u>
2.96	2.17

TABLE 5
 RELIABILITY ANALYSIS OF INTRAHOUSEHOLD FOOD PROBLEM ITEMS
 (N=2204)

RELIABILITY ANALYSIS

Cronbach Coefficient Alpha

for RAW variables: 0.671
 for STANDARDIZED variables: 0.742

Standardized Variables

<u>Deleted Variable</u>	<u>Correlation with Total</u>	<u>Alpha</u>	<u>Label</u>
H1	0.546	0.697	HH Ever Rely on "Emergency" Foods
H2	0.588	0.689	Ever Run Out of Money for Food
A1	0.709	0.667	HH Adults Ever Cut Size of or Skip Meals
A2	0.701	0.669	HH Adults Ever Eat < They Should
USDAS	0.640	0.680	Perceived Adequacy of Food Eaten by Family
FDMNY1	-0.432	0.840	Adequacy of Food Money
RD	0.428	0.717	R Ever Not Eat for Whole Day
COPE1a1	0.332	0.733	Freq of Buying & Serving Less Exp Foods
COPE4a2	0.459	0.712	Freq of Not Pay Bills on Time

TABLE 6

RELIABILITY AND GUTTMAN ANALYSIS OF FIVE HUNGER RELATED ITEMS (N=2204)

RELIABILITY ANALYSIS

Cronbach Coefficient Alpha
 for RAW variables: 0.841
 for STANDARDIZED variables: 0.838

Standardized Variables

<u>Deleted Variable</u>	<u>Correlation with Total</u>	<u>Alpha</u>	<u>Label</u>
USDAS	0.675	0.795	Sometimes or Often Not Enough to Eat
H2	0.587	0.819	Ever Run Out of Money for Food
A2	0.747	0.775	Adults Ever Eat < They Should
A1	0.741	0.776	HH Adults Ever Cut Size of or Skip Meals
RD	0.464	0.852	R Ever Not Eat for Whole Day

GUTTMAN ANALYSIS

Coefficient of Reproducibility	CR = 0.893
Minimum Marginal Reproducibility	MMR = 0.615
Coefficient of Scalability	CS = 0.722

are summed. Factor analysis of these five variables reveals the existence of a single factor. Remember that in the eight item CCHIP scale in Example 1 there was some redundancy in that the alpha coefficient would not drop below 0.8 if any one of the variables were to be omitted (Table 3). Thus, each item of the CCHIP scale (example 1) enhances the overall reliability of the scale. The same is not true of the five item scale in this example. The omission of any one of three separate variables would drop the alpha coefficient below 0.8 (Table 6). Thus all of the individual items except possibly H2 must be present for the scale to be reliable -- it has no built-in redundancy, something which good scales should have.

These five questions form an additive scale, but this scale does not allow for the definition of clearly distinguishable levels of hunger. Applying Guttman analysis, although the CS is 0.72 the CR is 0.89 (which is unsatisfactory), illustrating that this is not an ordered scale. This is not unexpected given the prevalences of the individual items. In particular, apart from the question about ever not eating for a whole day, which has a prevalence of 15% in these data, each of the other four questions has a prevalence between 41% and 48%, and they are strongly correlated, with coefficients ranging from 0.50 to 0.76. In an effort to define well-ordered levels of hunger one must select questions with a wider range of prevalences, as in Example 3 that follows.

Example 3: Using a scaled hunger measure to differentiate levels of severity (version 2)

In this final example we extract data from the same five CCHIP surveys, drawing on questions relating to hunger in adults to develop a scale that differentiates levels of severity. In order to accomplish this goal, variables that are well intercorrelated but have a wider range of prevalences must be chosen. Table 7 shows the candidate variables, their prevalences and intercorrelations, as well as their loadings on the first factor in principal components factor analysis. There are two newly added variables that indicate more serious problems, i.e. AD5 which corresponds to the respondent reporting that any or all of the 3 problem areas of H2, A1 and A2 were present in the previous month for an average of at least 5 days, while RD1 indicates that the respondent reported not eating at all on at least 1 day in the past month because of a lack of money to buy food. The first factor in the factor analysis explains 53.3% of the variance, and the second factor has an eigenvalue of only 0.87. Because of the correlations and range of prevalences, a set of levels of hunger with good Guttman properties can be constructed using these seven variables. Table 8 lists the level definitions, which group items with similar prevalences together and shows the result of the Guttman analysis based on these levels. This set of variables has strong Guttman properties (CR=0.94 and CS=0.77), and all levels are well represented in

TABLE 7

FACTOR ANALYSIS OF WELL CORRELATED VARIABLES WITH A RANGE OF PREVALENCES

MEAN	H1 0.659401	USDAS 0.440509	H2 0.484105	A2 0.413261
MEAN	A1 0.435967	AD5 0.243415	RD1 0.105359	

CORRELATIONS

	H1	USDAS	H2	A2	A1	AD5	RD1
H1	1.00000	0.46593	0.45652	0.45527	0.49852	0.31834	0.19982
USDAS	0.46593	1.00000	0.50231	0.61329	0.61819	0.41329	0.34504
H2	0.45652	0.50231	1.00000	0.51758	0.51359	0.38437	0.29506
A2	0.45527	0.61329	0.51758	1.00000	0.77046	0.46310	0.35784
A1	0.49852	0.61819	0.51359	0.77046	1.00000	0.45097	0.32471
AD5	0.31834	0.41329	0.38437	0.46310	0.45097	1.00000	0.36029
RD1	0.19982	0.34504	0.29506	0.35784	0.32471	0.36029	1.00000

INITIAL FACTOR METHOD: PRINCIPAL COMPONENTS

FACTOR1

H1	0.66645
USDAS	0.79351
H2	0.72523
A2	0.84496
A1	0.84625
AD5	0.65219
RD1	0.52481

VARIANCE EXPLAINED BY FACTOR

FACTOR1	3.730621
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TABLE 8

A GUTTMAN SCALE FOR SEVERITY OF HUNGER

LEVEL 1: H1
 LEVEL 2: USDAS OR H2 OR A1 OR A2
 LEVEL 3: AD5
 LEVEL 4: RD1

COEFFICIENT OF REPRODUCIBILITY 0.9403
 MINIMUM MARGINAL REPRODUCIBILITY 0.7367
 PERCENT IMPROVEMENT 0.2036
 COEFFICIENT OF SCALABILITY 0.7733

CORRELATION COEFFICIENTS

	LEVEL4	LEVEL3	LEVEL2	LEVEL1
LEVEL4	1.0000	0.3603	0.2532	0.1999
LEVEL3	0.3603	1.0000	0.4286	0.3185
LEVEL2	0.2532	0.4286	1.0000	0.5533
LEVEL1	0.1999	0.3185	0.5533	1.0000
SCALE-ITEM	0.3390	0.4836	0.5910	0.5016

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
LEVEL 0	551	25.0	551	25.0
LEVEL 1	249	11.3	800	36.3
LEVEL 2	797	36.2	1597	72.5
LEVEL 3	375	17.0	1972	89.5
LEVEL 4	232	10.5	2204	100.0

this low income sample of households.

Discussion

These examples demonstrate how sets of items that are thought to relate to a particular construct, in this case hunger, may be examined using a combination of correlational analyses, including factor analysis and reliability analysis to check on their scalability. The items may form a reliable additive scale and yet not necessarily have good ordering properties (as in example 2). On the other hand, if a strongly ordered Guttman scale can be constructed, as in examples 1 and 3, it has the added advantage that the ordered levels can be interpreted as levels of severity of the construct.

The methods used here are described in a variety of texts. A relatively recent book by Streiner and Norman (1989) is a straightforward guide to the entire process of building scales. Earlier books include Nunnally (1978) and Carmines and Zeller (1979).

The examples presented make use of dichotomous items only. Although dichotomous items are required for Guttman analysis and are standard in reliability analysis, some authors, e.g., Comrey (1978), have said that they should not be used in factor analysis. The techniques of factor analysis were developed assuming Gaussian (normal) distributions, and so one should proceed with care in non-standard cases. One should avoid using

items with very low (5% or less) or very high ($\geq 95\%$) prevalences and should ensure that the data sample employed is both large enough ($N > 300$) and representative enough that the correlation matrix of the items of interest is stable. With these precautions, factor analytic procedures can be a useful guide, contributing to the process of scale construction.

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**Validation of Measures for Estimating the
Prevalence of Hunger and Food Insecurity
in the Current Population Survey Module:
A Combination of Cornell and CCHIP Items**

Final Technical Report

by

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June, 1994

Introduction

In January 1994, the United States Department of Agriculture (USDA) convened the Food Security Measurement and Research Conference in Washington, D.C. The purpose of the conference was to help plan a hunger and food insecurity module for the 1995 Current Population Survey (CPS). At the conference, the goals delineated for the module were: 1) to measure and to estimate the prevalence of hunger and food insecurity in the U.S. population, 2) to secure policy- and program-relevant information to guide decision-making, and 3) to facilitate additional policy-relevant research on hunger and food insecurity.

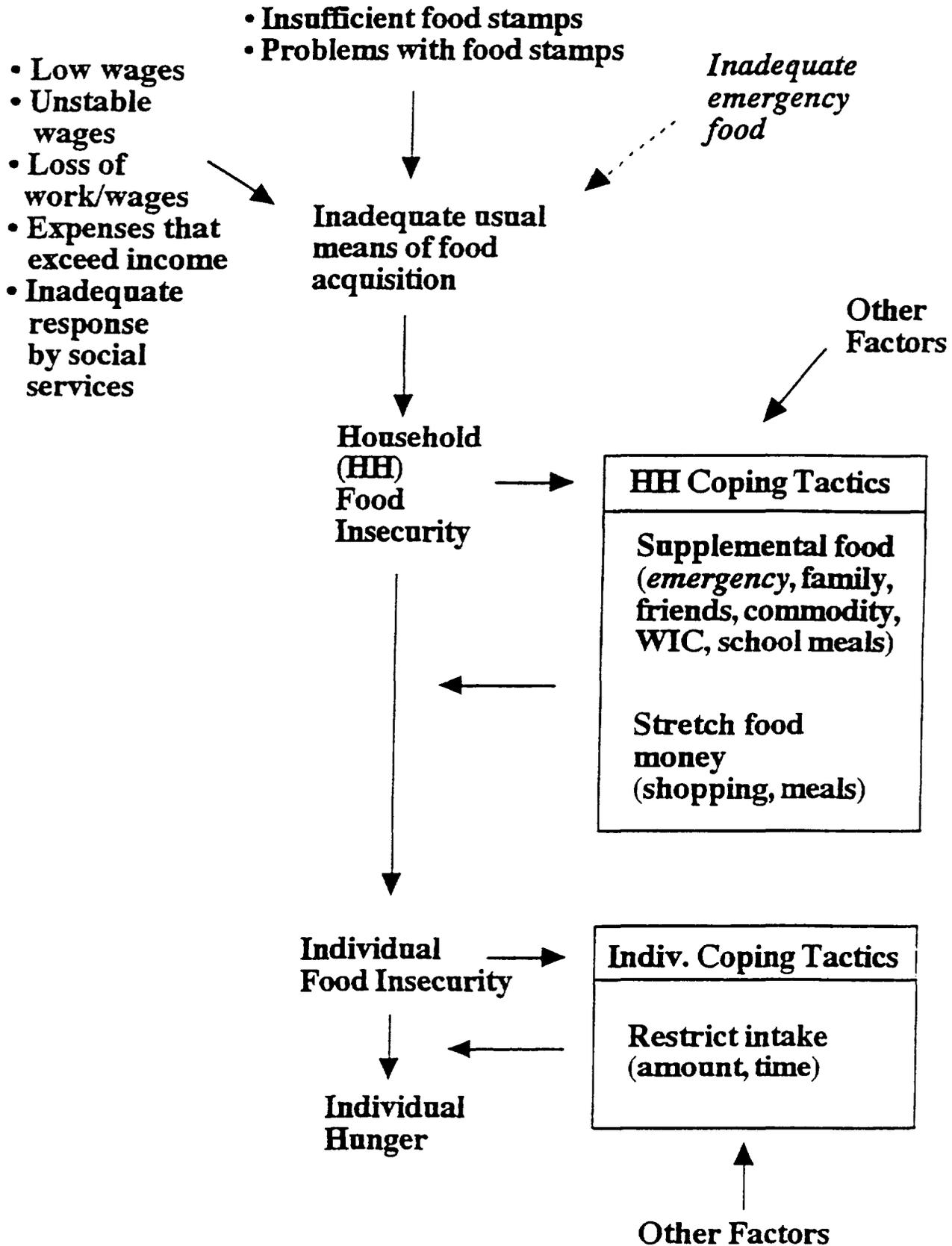
Developing a module that will yield valid, and thus credible, measures and prevalence estimates of hunger and food insecurity from a set of questionnaire items is, in general, a challenging problem. This report presents findings and recommendations derived from research completed at Cornell University aimed at validating methods for measuring and estimating the prevalence of hunger and food insecurity for the 1995 Current Population Survey. This research used items from the two most widely used and theoretically sound survey questionnaires available: the Community Childhood Hunger Identification Project (CCHIP; Wehler et al., 1992) and two Cornell surveys, one conducted in 1988 and a second in 1993 (Radimer, 1990; Radimer et al., 1992; Kendall et al., 1994).

Summary of Previous Research

The research described in this report builds upon the research of Dr. Kathy Radimer that resulted in the development of the Cornell hunger and food insecurity measures. In her research, Dr. Radimer conducted in-depth interviews with 32 women with children living in the home who had experienced hunger. From these interviews, two conceptualizations of hunger emerged, one narrow and one more broad (Radimer, 1990). The narrow concept referred to insufficient food intake and going without food and included the physiological phenomenon of hunger pangs. The broader concept encompassed problems with household food supply, quality of diets, feelings about the situation and what was done to try to maintain household food supplies, a conceptualization that seems consistent with "food insecurity". The following definition of food insecurity was developed based on this research: the inability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so (Radimer et al., 1992).

Figure 1 shows the conceptual framework that was developed based on Dr. Radimer's work and guided the research described in this report. Food insecurity is experienced differently at the household level than at the individual level, and the experience

Figure 1. Conceptualization of Hunger and Food Insecurity



differs between adults and children at the individual level. There are four components of the phenomenon at each of the levels, the quantitative and qualitative aspects of the food consumed and the psychological and social components experienced by households and individuals. Food insecurity and hunger forms a continuum of domains that progresses from anxiety at the household level to the extreme condition of hunger among children when they do not have enough to eat.

At the household level, the most important aspects of food insecurity as described by the interviewees were anxiety about their food supply and the depletion of this supply. An important consideration underlying the food depletion component of the household food supply was whether the food was acquired in socially acceptable ways. The quantitative aspect of the household food supply was seen as more important than the qualitative aspect by the interviewees in this initial research.

At the individual level, hunger also has quantitative, qualitative and social components and is a managed process that appears to have a sequence. When a household's usual means of food acquisition (this may include reliance on food stamps, but usually does not include reliance on food pantries or soup kitchens) becomes inadequate, food anxiety is experienced and results in a variety of coping tactics. These coping tactics generally do not result in averting food insecurity, but may determine which components are experienced and who in the household experiences food insecurity. The quality and quantity of adult's diet and the quality of children's diets is affected next, and finally, the quantity of children's food intake is affected.

Reflecting this conceptual framework, the food insecurity measures developed by Dr. Radimer included four items directed at the household, four directed at adults and four directed at children. Within these three levels, at the household level, two items asked about food anxiety and two about food depletion and at the individual level, two items asked about the qualitative and two about the quantitative components of hunger and food insecurity.

A survey was conducted in 1988 with 189 low-income women to test these items. The validity of these 12 items was assessed in terms of the extent to which the items measured what they were intended to measure (face and content validity) and the extent to which the items that were designed to measure the same concept or component of hunger related to each other (construct validity) (Radimer et al., 1992). Because the items were developed from statements made by women who had experienced hunger, they were assumed to have content validity. Construct validity of the items was determined by factor analysis which indicated that items assessing hunger at the three levels (household, adults and

children) fell into three separate factors. A separate measure was formed for each of these three levels and the reliability of the measures assessed using Cronbach's alpha. The reliability of each of the measures exceeded 0.90, indicating very high reliability. The criterion-related validity of the measures was then assessed by examining relationships between the scores on the measures and commonly accepted risk factors for hunger and food insecurity such as low income, low food expenditures and physical consequences of hunger such as hunger pangs and weight loss. Significant correlations were observed between scores on the measures and participation in food stamps, income and the physical consequences of hunger (Radimer et al., 1992).

Dr. Radimer's work and that of other researchers such as Wehler and colleagues of CCHIP (Wehler et al., 1992) and Breifel and Woteki (1992) at the National Center for Health Statistics laid the groundwork necessary to directly measure the phenomenon of hunger and food insecurity. However, additional research was needed to confirm that the measures appropriately identify individuals experiencing hunger and food insecurity. The research described in this report was undertaken to obtain information that would serve to validate the ability of the Cornell and CCHIP items to directly measure hunger and food insecurity and provide estimates of their prevalence. Estimating the prevalence of hunger and food insecurity accurately will assist in the development of policies and programs designed to alleviate these problems and provide a means of measuring progress of programs designed to solve the problem.

Methodological Principles

To guide the research described in this report, a set of 15 principles have been followed that provide the foundation for a successful module. These principles are based on the previous published and unpublished research conducted on hunger and food insecurity at Cornell and the work of others, are consistent with the current scientific literature on hunger and food insecurity, and reflect an understanding of valid measurement and estimation of prevalence that is consistent across a number of scientific fields. These principles are discussed in terms of: scientific approach to validation, information needs for policy and programs, theoretical framework, and methodological issues.

Scientific Approach to Validation

1. "Measurement is the assignment of numbers to observed phenomena according to certain rules." (Bohrnstedt, 1983) For measures to be valid, they must reflect the theoretical structure of the phenomena they purport to represent. Achievement of the goals of the CPS.hunger and food insecurity module requires measures, and not indicators, of hunger and food insecurity. Measures directly and closely relate to the phenomena of

interest, whereas indicators need only indirectly relate in some way.

2. Valid estimation of the prevalence of hunger and food insecurity requires demonstration of the validity of both its measures and the procedures for estimating prevalence. Validation must be done following sound and widely accepted methodological principles.

3. There is a hierarchy of measurement methods: definitive, reference, and field (Uriano and Cali, 1977). Definitive methods are the foundation of the hierarchy and achieve high accuracy because they reflect, in a fundamental way, the theoretical structure of the phenomena they purport to represent. Reference methods are the next level of the hierarchy. Reference methods achieve accuracy because they directly and closely relate to the phenomena of interest, and their accuracy is demonstrated by comparison to definitive methods. Field methods "are generally fast, cheap, and usually require relatively non-sophisticated personnel for application" (Uriano and Cali, 1977). The CPS module is intended to be a reference method for assessing hunger and food insecurity that can be used in other USDA and NCHS surveys. As a reference method, it must be validated through comparison with definitive methods that are based upon a thorough understanding of the phenomena of interest.

4. The required, thorough understanding of the phenomena of interest can only be obtained through constructivist research. This research ensures that concepts important to the understanding of hunger and food insecurity are not missed, and that the sequencing and causality of events is well-established. Radimer et al. (1990; 1992) employed in-depth personal interviews to construct an understanding of hunger and food insecurity. Key concepts arose from these interviews. The wording of items intended to measure these concepts was taken directly from the wording of those interviewed. Then, these items were tested qualitatively and quantitatively in further research (Radimer et al., 1992).

5. Study of ordinary conversations is essential to the development of survey instruments. As stated by a National Academy of Sciences report on cognitive aspects of survey methodology: "A standardized interview differs from the acquisition of information in a normal conversation. It was proposed that survey instruments be organized to follow the same principles that work well in everyday conversation. A prerequisite, then, for the design of a survey instrument would be the study of ordinary conversations about the survey topic. This proposal was related to two broader concerns. The first is the apparent frustration of respondents at the artificiality of the typical survey interview. Interviews that were structured more like conversations would be "humanized"--less mechanical for both respondents and interviewers. The other broad concern is poor recall. A general hypothesis that emerged during the conference was that survey questionnaires might induce more accurate recall if their organization paralleled the organization

of the experience in memory. The flow of ordinary conversation would provide a good indication of how memories for a class of events are organized." (Jabine et al., 1984).

6. The inclusion of multiple items is a well-established principle of measurement theory, and is a critical characteristic of measures of hunger and food insecurity. Furthermore, multiple items are required for the accurate estimation of prevalence, particularly in minimizing the number of false negatives.

Information Needs for Policy and Programs

7. The products or outputs of measuring hunger and food insecurity must have the potential to be related to the different policy and program actions that might be taken. At a minimum, it must be possible for the outputs to specify the level of social organization that is affected (e.g., household, individual) and the severity of the food problem. From discussions with USDA staff, it is crucial that the module be able to yield valid estimates of three prevalences that have policy and program relevance. The three prevalences are the proportion of households that have experienced: 1) food insecurity, 2) hunger (defined as hunger among individuals), and 3) severe hunger (defined as hunger among children).

8. From discussions with USDA staff, prevalences should be estimated for time periods that encompass important complete cycles in people's lives. Income and program allocations typically cycle monthly. Seasons of the year affect availability of work and thus income, food availability, and major household expenses such as heating costs. Therefore, it is important to estimate prevalence in the last 30 days and in the last 12 months.

Theoretical Framework

9. Food insecurity is experienced at two different levels of social organization (households and individuals), and generally progresses through a specified sequence between the levels. A food problem is typically first experienced as food insecurity at the household level. This problem is next generally experienced as food insecurity at the individual level by adults. The problem can progress to hunger at the individual level experienced by adults and their children. These are crucial distinctions to make because they have important policy and program implications, as discussed above in principle 7.

10. Hunger and food insecurity have multiple components. These components relate to the nature of the problem as it is experienced, and include quantity and quality of household food supply and individual food intake, as well as the psychological feelings and social context associated with the experience of food problems. Retaining these distinctions is important because of policy and program implications, e.g., different interventions may be appropriate for problems of fundamentally different

natures.

11. Coping tactics are not central to the measurement of hunger and food insecurity because they reflect the resources of the community (e.g., availability of food pantries), the household, and the individual more than they reflect the seriousness or nature of the hunger or food insecurity experience. In some environments and at the with-in household level of social organizations, selected coping tactics (e.g., adults often skipping meals) may serve as indirect indicators of hunger or food insecurity, but the usefulness of such indicators will vary greatly according to environment.

Methodological Issues

12. Although it is desirable that a single method or instrument be used to measure and estimate the prevalence of hunger and food insecurity, ordering households or individuals on a scale "is not as useful for planning and implementing prevention programs as is the identification of specific sub-groups" (Winkleby et al., 1994). Given the two relevant levels of social organization, the conceptually different components of food problems, and the lack of a strict sequence among components at the individual level, a single, simple, additive scale cannot capture the relevant conceptual, policy and program information, and thus will not accomplish the module's goals. For example, if measurement of the severity of the food problem is needed and a Guttman scale is used, then one confronts the difficult problem of identifying valid cut-points. However, a set of valid items can be used to differentiate household and individual domains of hunger and food insecurity.

13. From the Radimer research with low income urban and rural, Black and White poor women, described above, interviewer debriefings indicated that three response categories enhanced the comfort of respondents in answering affirmatively to hunger items. The response categories capture how often the item is true of their situation, not frequency of occurrence per se.

14. This research indicated that respondents find it easier to respond to statements than questions, thereby resulting in more accurate responses. As discussed in principle 5, this experience is supported by research on cognitive aspects of survey methodology.

15. Items on the instrument to measure hunger and food insecurity must incorporate the concept of resource adequacy. Note that poor people perceive food stamps as money in our research. Items should be tied specifically to money at the household level, but not at the individual level. Instead, at the individual level, the item can include the phrase "because you can't afford food" to capture the concept of resource adequacy.

Methods

Overview

Data from two surveys were available to assist in the validation of measures for hunger and food insecurity. A 1988 survey conducted by Dr. Radimer with 189 low-income women tested many items developed from her qualitative work (Radimer et al., 1992). A 1993 survey conducted with a randomly chosen group of 193 women with children living at home, included Dr. Radimer's recommended set of 12 items, an additional item to assess household level diet quality and the 8 CCHIP items, administered as described by Wehler et al. (Kendall et al., 1994; Wehler et al., 1992).

Guided by the 15 principles delineated above, all of the Cornell and CCHIP items used by Cornell researchers in the 1988 and 1993 surveys were examined carefully. The validity of each item was assessed and then of sets of items. Validity was assessed in seven ways. First, the face validity of each item was examined in relation to current understanding of how respondents interpret their wording to ensure that the items appear to measure what was intended. Second, the content validity of each item was examined to ensure that it covers part of the domain dictated by an understanding of hunger and food insecurity, and also to ensure that the entire domain was covered. Third, the prevalence of positive response for each item was examined for consistency with other items according to the levels and components of hunger and food insecurity. Fourth, construct validity of sets of items was assessed using factor analysis. Fifth, reliability was assessed using Cronbach's alpha. Sixth, criterion-related validity was assessed by comparison of hunger and food insecurity groups derived from sets of items with several definitive measures such as income, employment, education, participation in assistance programs, frequency of food consumption, and home food inventory. Seventh, criterion-related validity was assessed by examination of the responses of those individuals who might be considered "false positives" (individuals classified food insecure who were of relatively high socioeconomic status) to their entire portfolio of definitive information obtained in the surveys.

Using this approach, sets of items (measures) were identified that must be part of the CPS module if it is to meet its intended goals. These items individually are valid, and together form a measuring instrument for hunger and food insecurity that estimates prevalences of food insecurity at the household and individual levels, and of adult and child hunger. USDA has stated that three prevalences have particular policy and program relevance: households with food insecurity, hunger among individuals, and hunger among children. However, for the purposes of validation and because two items important for

measuring adult hunger were included in the 1988 but not the 1993 survey, four mutually exclusive groups were identified: household food secure, household food insecure, individual insecure, and child hungry. Then, an adult hungry group was identified as a subset of the adult insecure group.

Study Design

A survey of households containing women with children living at home was conducted between January and July of 1993 in a rural county of New York State. The sample for the survey was randomly selected from a data base gathered three years previously as part of a health census of the county. Eighty-six percent of county residents (17,144 households with a total of 44,565 individuals) provided information for the census. Women 40 and older and those with 16 or more years of education were excluded from the sampling frame, resulting in 3,433 women who were eligible for selection into the sample. Six strata were formed based on whether or not the respondent had a telephone and whether they had medicaid insurance, some other form of health insurance or no health insurance. These variables were chosen because analysis of the demographic information available from the census indicated that characteristics associated with low socioeconomic status clustered with absence of telephone and medicaid or no health insurance. Each of the six strata was further stratified into five age groups, 15-19, 20-24, 25-39, 30-34 and 35-39. Disproportionate sampling was done within these thirty strata in order to ensure adequate representation of the most at-risk groups and comparable age distributions across the groups. In nineteen of the strata, the entire population was sampled. In seven of the remaining eleven strata, approximately one-half of the population was sampled. The other four strata were comparatively least at-risk, and were sampled at the lowest rate.

A sample of approximately 200 households was desired, based upon the previous survey using the Cornell measures which found statistically significant relationships between the measures and risk factors for hunger and food insecurity with a sample size of 189. In order to account for refusal to participate and failure to locate potential subjects, a pool of 639 women was selected from the health census. Fifty-two percent of the women (331) no longer lived at the address given during the health census. In the two most vulnerable demographic strata, 66% could not be located, in the three at risk strata, 56% and in the comparison group stratum 31% could not be located. Of the remaining 308 women, 35% refused participation in the survey, resulting in a sample of 200 women. Refusal rates were 18% in the two most vulnerable strata, 40% in the three at risk strata and 32% in the comparison group. Because only seven of the 200 women fell into the youngest age category, they were dropped from the analysis, yielding a final sample of 193.

Two interviews separated by approximately three weeks were conducted with each respondent. During the first interview, a questionnaire containing demographic information, information on risk factors for food insecurity, use of coping strategies, and the Cornell and CCHIP hunger and food insecurity items was administered to each study participant by trained field workers. All of the Cornell items were expressed as statements based on recommendations that arose out of the previous survey using these items (Radimer et al., 1990). The possible responses to the Cornell items were "not true", "sometimes true" or "often true". Because no items assessing the qualitative component of the household food supply were contained in the original set of Cornell items, the following statement about this component of food insecurity was included on the questionnaire: "We eat the same thing for several days in a row because we only have a few different kinds of food on hand and don't have money to buy more." CCHIP items were administered following the description in Wehler et al. (1992) as questions with no/yes answers.

A questionnaire about the frequency of fruit and vegetable consumption was administered during the first interview. Four questions about food consumption patterns indicative of disordered eating behaviors from the Stanford Eating Disorders Questionnaire (Agras, 1987) were included on the questionnaire. At both interviews, a 24-hour recall was taken and an inventory of household food supplies was conducted. The household food inventory tool contained 51 food items with four quantitative response categories, with one indicating none of the food present and four a large amount present (Kendall et al., 1994). The response categories were determined based on the weight or volume of the item as purchased and judgments of differences that would be meaningful and would differentiate those with depleted food supplies from those with replete food supplies.

The survey instruments were pretested in a sample of 20 low-income women recruited from the Tompkins County Supplemental Food Program for Women, Infants and Children (WIC) and the Broome County Expanded Food and Nutrition Education Program prior to use in the survey. Following the pretest, a number of categories were revised on the food inventory instrument to better differentiate household food supplies.

The study protocol was approved by the Cornell University Human Subjects Committee and informed consent was required of all respondents prior to participation in the study. Each respondent received \$20 as compensation for participation.

Statistical Analysis

The percentage of subjects responding "sometimes true" or "often true" to each Cornell food insecurity item was carefully examined. These responses were compared with the percentage

answering "hardly ever true", "sometimes true", "almost always true" or "always true" in the 1988 survey conducted by Dr. Radimer, from which the items were developed. Any subject answering "sometimes true" or "often true" to any item within a measure was categorized as food insecure. Response patterns indicated that two of the individual level quality items did not appear to be interpreted by the subjects as intended, and that one of the household anxiety items was not a good match with its companion item. These three items were omitted from the factor analysis that resulted in construction of measures. The item assessing the quality of the diet at the household level that was included in the 1993 survey was included in the factor analysis.

The percentage of subjects responding yes to each CCHIP item was also carefully examined. Response patterns indicated that two CCHIP adult items and one CCHIP child item did not appear to be interpreted by subjects as intended or did not match with companion items. These three items were omitted from the factor analysis.

Factor analysis with orthogonal (varimax) rotation was conducted on the responses to the ten Cornell items and the four CCHIP items from the 1993 survey to determine factor loadings. Oblique rotation yielded similar results. One CCHIP child item "Go to bed hungry" taps severe hunger, and is rarely answered positively. It could not be used in the factor analysis, but was retained for a total of five CCHIP items. The factor analysis and the conceptual framework were used to construct the measures that were used in the rest of the analysis.

The 24-hour recalls were analyzed for nutrient content using Nutritionist 3 (N-Squared Computing, Silverton, Oregon). The 51 items on the household food inventory were grouped with foods of similar composition. For example, milk, cheese and yogurt were grouped into a dairy group and fresh vegetables, frozen vegetables, canned vegetables, potatoes and frozen potatoes were grouped into a vegetable group. The response categories for each item represented an ordinal scale, so all responses for items within a food group were summed to derive a score for each subject for each group. A paired t-test conducted on the food groups derived from the two household inventories indicated no significant differences between the two sets of data, so the data from the two inventories were averaged together.

Response categories for the four questions about eating behaviors also represented an ordinal scale. Responses to all four questions were summed into an eating pattern score. High scores on the scale are suggestive of disordered eating behaviors.

Analysis of variance was used to assess the strength of the association between food insecurity classification and dietary

variables, anthropometric measurements and demographic characteristics such as income and education. Relationships were considered statistically significant if the probability of observing the relationship was less than $p=0.05$. Relationships between the various dietary variables were assessed using Pearson and Spearman correlations. The analyses were weighted to account for the stratified sampling scheme and were conducted using SAS/PC. All results presented below have been adjusted to reflect sampling weights.

Results

Subject Characteristics

Table 1 shows selected characteristics of the households who participated in the survey. The average age of respondents was 33.6 years and average household size was 4.3 persons. Four-fifths of respondents reported traditional nuclear families consisting of two parents with children. Approximately one-third of women interviewed were employed full-time and one-third were unemployed, while the other third were employed part-time. Among the 80% of the sample that was married, 55% of husbands were employed full-time, 28% were unemployed and 17% were employed part-time. Only 16% had less than a high-school education, while 44% were high school graduates and 41% had some additional education or training beyond high school. Annual income for one-quarter of the sample was less than \$10,000, between \$10,000 and \$15,000 for 18%, between \$15,000 and \$20,000 for 13%, between

\$20,000 and \$25,000 for 14% and over \$25,000 for 37% of the sample.

Nearly two-thirds (65%) of the sample participated in at least one food assistance program (percentage does not include participation in school lunch at full price). The program with the broadest participation was school lunch, with 51% of the women having children receiving free or reduced price school lunch. Twenty-eight percent of the women had children who participated in the school breakfast program. However, 11% of the sample did not have children of school-age and for 32% of the sample, a breakfast program was not available. Thus, of the 56% of the sample able to participate in school breakfast, half were participants. Twenty-one percent of the sample were recipients of food stamps. Only 17% of the sample participated in the Special Supplemental Program for Women, Infants and Children (WIC). However, 59% of the sample was not eligible for the program, either because they were not pregnant or had no children less than five years old. Only two individuals reported receiving commodities donated through The Emergency Food Assistance Program and only two reported using a food pantry

Responses to Hunger and Food Insecurity Items

The percentages of women in the sample responding positively to the Cornell and CCHIP hunger and food insecurity items are shown in Table 2. For the CCHIP items, the percentage of the women indicating the event occurred in the last 30 days and in five or more of the last 30 days are also shown. For both CCHIP and Cornell items, a larger percentage responded positively to household level items than to the individual level items. The lowest percentage of positive responses was given to the child quantitative items.

The far right-hand column of Table 2 contains our recommendation on retaining or deleting the items for use in further analysis in this research. For the Cornell items, the household level item "I worry about where the next day's food is going to come from" does not appear to be an appropriate companion item to "I worry whether my food will run out before I get money to buy more" because it was answered positively by a much smaller percentage than its companion item. This item was therefore omitted from the analysis, and in future surveys, an alternative item "I worry about whether the food that I can afford to buy for my household will be enough" should be substituted as the second Cornell item to measure the construct of household food anxiety. This item was used in the 1988 survey, but was not chosen by Dr. Radimer as one of the final 12 items she recommended to measure household food anxiety. The CCHIP item "Does your household ever run out of money to buy food?" is a good companion item for measuring the construct of household food anxiety.

For the Cornell items, one of the original individual adult qualitative component items does not appear to have been interpreted as expected based upon the percentage of women responding positively to it. Data from the 1988 survey showed that the adult item "I can't afford to eat the way I should" was answered positively by a much greater percentage of women both with and without children than its companion item so it was eliminated from further analysis. Also at the adult individual level, two CCHIP items relating to the quantitative component of hunger and food insecurity were eliminated. Both "Do you ever cut the size of meals or skip meals because there is not enough food in the house?" and "Do you ever eat less than you should because there is not enough money for food?" were deleted because more than twice the proportion of women answered these items positively compared to their companion Cornell items. Later in this report, these items will be reconsidered because of the potential usefulness of responses related to the last 30 days in the identification of adult level hunger.

In both the 1988 and 1993 Cornell surveys, the item "I cannot afford to feed my children the way I think I should" was answered positively by a substantially larger percentage of women than its companion item, "I cannot give my child(ren) a balanced

meal because I can't afford that," and thus was eliminated. The use of the word "should" (as in both the adult and child qualitative items) may have connotations of very high quality diets that are nearly impossible to meet which would explain the larger than expected positive responses to the items. For assessing child level hunger all but one of the CCHIP items, including the item that taps into the most severe level of hunger, "Do your children ever go to bed hungry because there is not enough money to buy food?" were retained for further analysis. The CCHIP item, "Do your children ever eat less than you think they should" was deleted because the percentage of women answering positively was greater than for any of the other diet quantity items, perhaps because of the word "should."

Examination of Construct Validity of Retained Items

The results of the factor analysis on responses to the hunger and food insecurity items retained are shown in Table 3. In these results the importance of both the level of social organization affected (eg., household and individual) and the components of hunger and food insecurity (eg., quantity of food and quality of diet) are apparent. All of the retained household items loaded heavily on factor 1. The items measuring hunger and food insecurity at the individual level loaded on three different factors. Factor 2 contains the Cornell adult-level quantity items and the CCHIP child-level quantity of food items. Factor 3 contains the Cornell adult and child diet quality items and factor 4 contains the Cornell child-level quantity items. Each of these factors explains a significant proportion of the variance.

Table 4 shows the reliability scores (Cronbach's alpha) and the percent insecure for the set of items or measures for each domain of hunger and food insecurity. Also shown is the resulting alpha and percent of the sample defined as insecure if a particular item were deleted. With the exception of the child hunger measure which has an alpha of 0.71, all of the measures had a reliability score greater than 0.80. Furthermore, these sets of items yield quite stable estimates of prevalence. The greatest difference that would be found by the elimination of a single item occurs within the individual insecure set of items where deletion of one item would change the prevalence estimate by about five percentage points. For the other sets, eliminating an item would not change a prevalence estimate by more than three percentage points.

Relation of Hunger and Food Insecurity Measures To Definitive Criteria: Criterion-Related Validity

Based upon the conceptual framework, the results of the factor analysis and the reliability analysis, three sets of items or measures were selected to categorize households into groups for the examination of criterion-related validity. These three measures were the household insecure measure including all the

household items, the individual insecure measure including the two individual level qualitative items and the two adult-level quantitative items, and the measure for child hunger including five quantitative items. The child qualitative item was grouped with the individual insecure items rather than the child hunger items because, in a more general population sample, the child qualitative item seemed to result in an overestimate of child hunger and because the quality of children's diets may be sacrificed concurrently with that of adult's diets. Positive responses to the child quantitative items were considered to represent the extreme of the progression from household food insecurity to childhood hunger. It was hypothesized that these three measures would identify households experiencing a progressive increase in the severity of food insecurity and hunger in three distinct domains.

For the purposes of validation, these three measures were used to classify households into four mutually exclusive groups: a "Food Secure" group which answered negatively to all items; a "Household Insecure" group which answered positively only to one or more household level items; an "Individual Insecure" group which answered positively to one or more of the adult level items or the child quality item; and a "Child Hunger" group which answered positively to child quantity items. Forty-two and two-tenths percent of the sample was in the Secure group, 28.4% in the Household Insecure group, 13.2% in the Individual Insecure group, and 16.2% in the Child Hungry group.

Demographic Characteristics: Food insecurity and hunger status was significantly associated with demographic characteristics of subjects (Table 5). Food insecurity status was significantly associated with income ($p=0.0001$). As the severity of food insecurity increased, the percentage of households with incomes less than \$10,000 increased markedly and the percentage of households with incomes greater than \$25,000 decreased. Years of education of the women responding to the survey was also significantly associated with food insecurity and hunger status ($p=0.01$). As food insecurity status worsened, women were much less likely to have greater than high school educations. A larger percentage of insecure and hungry households had less than a high school education than in secure households, but there was essentially no difference between the insecure and hungry groups.

Food insecurity status and employment status were significantly associated for males in those household with two adults ($p=0.004$) and was closely associated for females ($p=0.06$), although the statistical significance test fell short of the $p=0.05$ cutoff. A larger percentage of hungry households had both female and male members unemployed and a smaller percentage employed full-time than insecure and secure households.

Participation in the four major food assistance programs generally increased as food insecurity and hunger status worsened

and was significantly associated with food insecurity status for all four programs (food stamps, $p=0.002$; WIC, $p=0.0002$; school lunch, $p=0.0001$; school breakfast, $p=0.02$). The difference between the secure and insecure/hungry groups was much greater than the differences within these latter groups.

Income Source and Stability: Table 6 shows the percentage of each of the four groups that relied on income sources other than wages, experienced month to month fluctuations in income, had experienced income instability in the previous year and the reasons for that instability. In general, a larger percentage of people in the hungry and food insecure groups relied on sources aside from wages for income support than in the secure group. However, the percentage of individuals using these programs was quite small, even within the hungry group, of whom only 21% received support from AFDC and 3% from SSI. Participation in AFDC ($p=0.006$) and SSI ($p=0.001$), the programs with income eligibility criteria, was strongly associated with food insecurity status.

Food insecurity status was significantly associated with monthly income fluctuations ($p=0.0005$) with only two-fifths of hungry households reporting the same income from month to month, compared to approximately 70% of the other groups. Almost half of insecure and hungry groups reported income instability in the previous year, compared to about 30% of secure households. The most common cause of income instability in the previous year was job loss. Only loss of a spouse (through death or separation) was significantly associated with food insecurity status ($p=0.05$), although the other reasons for income instability were all associated with food insecurity status with a probability < 0.10 .

Household Expenses: Table 7 shows monthly household expenses for the four groups. For most categories, the secure group had the highest expenses. All four groups reported spending more money on food each month than they spent on rent or mortgage payments. On a per capita basis, the secure and insecure groups spent the most on food each month and the hungry group the least. Only total monthly expenditures ($p=0.02$) varied significantly by food insecurity status. One of the more striking results in this table is the lack of differences in rent and utility expenses between the secure group and the others.

Resources and Coping Tactics: Table 8 shows the proportion of individuals within each group who reported having resources such as savings or social networks upon which to draw in times of financial need and use of certain coping tactics. Food secure households were significantly more likely than insecure or hungry households to have savings ($p=0.0001$) and were significantly less likely to need to borrow cash from their families ($p=0.0001$). None of the rest of the coping tactics varied significantly by hunger and food insecurity status.

Relationships to Dietary Factors: Dietary characteristics of respondents are shown in Table 9. Significant associations were observed between food insecurity and hunger status and frequency of consumption of fruit ($p=0.0001$), salad ($p=0.0001$), carrots ($p=0.04$) and vegetables ($p=0.02$). For potato and fruit juice consumption, there were no marked differences across groups. Total weekly consumption of the six fruit and vegetable categories was also significantly associated with food insecurity and hunger status and declined progressively as food insecurity status worsened ($p=0.001$).

Based on the household food inventory, in each food category, there was a significant and progressive decline in the amount of food available in the household as food insecurity and hunger status worsened (dairy, $p=0.002$; meats, $p=0.0001$; grains, $p=0.0001$; fruits, $p=0.0002$; vegetables, $p=0.0001$; total household inventory, $p=0.0001$). Scores on the eating disorder scale increased significantly as food insecurity status worsened ($p=0.003$). Data from the 24-hour recall showed no significant association with food insecurity and hunger. This result is more likely due to the dietary method than the lack of a true difference, given the other dietary results presented above. Therefore, the 24-hour recall results were not included in Table 9.

In the final approach to criterion-related validity of the measures, the false negative and false positive were evaluated. The prevalence estimates shown in Table 4 indicate that the rate of false negatives was relatively small, as deleting each item in a measure resulted in little change in the prevalence estimate derived from that measure. The issue of false positives was assessed by examining all of the questionnaire responses for those individuals with high levels of income and education who were classified as food insecure based on their responses to the hunger and food insecurity items. Seven individuals were classified as Household or Individual Insecure who had an income greater than \$25,000 and more than a high school education. A reason could be identified for each respondent to account for their food insecurity classification. The most common reasons were loss of a job, loss of a spouse or a serious health problem which compromised ability to work.

Identification of Hungry Adults

Using data from both the earlier 1988 survey and the 1993 survey, two approaches to identify hungry adults were explored. Table 10 displays the proportion of women in the 1988 survey responding positively to the three adult level food insecurity items as well as positive responses to two questions that were candidates for pinpointing more serious food situations: "Did you lose weight in the past year because there wasn't enough food to eat?" and "In the past year, have you had hunger pangs but couldn't eat because you couldn't afford to?" Table 11 shows the responses on definitive criteria for households falling into the

"Hungry Adult" group based on responses to these five items, in comparison to responses for the other food insecurity and hunger groups. Although the numbers of households in the category of hungry adult is small (n=8), this group has lower monthly incomes and food expenditures than the households with food insecure individuals. This group also has higher participation rates in food stamps, WIC, cheese giveaways and emergency food assistance than households with insecure individuals. Food insecurity status was significantly related to income (p=0.0001), food expenditures (p=0.04), education (p=0.009), participation in the food stamp program (p=0.0001), free and reduced price school lunch (P=0.0001), USDA cheese giveaways (p=0.0001) and use of food pantries (p=0.0001).

An alternative approach using the previously omitted adult level items from the CCHIP survey was explored. Table 12 shows the responses to these two questions, particularly the responses to the "core" or stems of the question with a one-year time frame, the past 30 day time frame, and the five or more days in the last 30 days time frame. For each question, the percent of positive responses decreased through this series. Table 13 displays the results on definitive criteria comparing the households grouped according to these questions with the other food insecurity and hunger groups. Households with adults who said they had experienced these problems in the last 30 days (defined as adult hungry) actually appeared to be better off than the households with food insecure individuals. However, households with adults who said they had experienced these problems in five or more of the last 30 days (adult severe hunger) did appear to be worse off than the households with insecure individuals. As a matter of fact, this group appeared to be in more dire food situations than households with hungry children. Food insecurity status was significantly related to income (p=0.0006), education (p=0.02), male employment (p=0.0008), participation in the food stamps program (p=0.007) and in free and reduced price school lunch (P=0.0001).

These same relationships generally are seen with the other type of definitive criteria available in the 1993 data, dietary characteristics, as shown in Table 14. The hungry adults appear better off than the individual (adult, child) insecure while the adults with severe hunger are worse off than both the households with insecure individuals and those with hungry children. For dietary characteristics, food insecurity status was significantly related to frequency of consumption of fruits (p=0.002) and total consumption of fruits and vegetables (p=0.05), household inventories of dairy products (p=0.04), meats (p=0.004), grains (p=0.007), fruits (p=0.009), vegetables (p=0.02), total household food supplies (p=0.0002) and the eating disorder score (p=0.03). It should be noted, however, that sample sizes of both groups of hungry adults are small. Additional research is needed to confirm these results.

Prevalence Estimates of Hunger and Food Insecurity

Table 15 shows the demographic and dietary characteristics of the households classified as secure, household insecure, households with insecure individuals, and households with hungry children. In most of the previous tables with these categories, the categories were mutually exclusive, that is a household could be in only one category. In this table and Table 4, the data are presented in the form of nested prevalences, the form in which the data from the Current Population Survey will be used. This means that, for example, the data from a food insecure household with a hungry child is included in the household insecure group, as well as hungry child group. As shown in Table 4, the respective prevalences are 56.7% for household insecure, 26.3% for individual insecure and 16.2% for child hunger. As shown in Table 15, the strong relationships between the demographic risk factors participation in food assistance programs and dietary variables that were shown in previous tables with mutually exclusive categories are also evident here, further supporting the criterion-related validity of these measures. Statistical tests of these relationships could not be conducted because individuals are found in more than one group.

Discussion

The validity of a measurement tool rests upon its ability to reliably and accurately measure the phenomenon of interest. Three types of validity were examined in this research: content validity (one aspect of which is face validity), construct validity and criterion-related validity (Sims, 1981). Content validity refers to the extent to which items represent the concept being measured. Construct validity is evaluated by assessing the degree to which explanatory concepts account for performance on the measures and is often evaluated using factor analysis in order to identify the basic dimensions underlying a domain of responses. Criterion-related validity is assessed by relating measures to more direct measures of a phenomenon under investigation.

The validity of the combined Cornell and CCHIP hunger and food insecurity measures was assessed in four ways. First, the content validity of each item was examined in relation to our current understanding of how respondents interpret its wording to ensure that the item measures what was intended and covers the appropriate part of the domain of hunger and food insecurity. Second, the prevalence of positive response to each item was examined for consistency with other items covering the same level and component of hunger and food insecurity. Third, the construct validity of sets of items (measures) was assessed using factor analysis. Fourth, criterion-related validity was assessed by comparing hungry and food insecure groups classified on the basis of the measures with definitive measures such as income, employment, education, participation in food assistance and income maintenance programs, and dietary characteristics.

The items included in the Cornell and CCHIP hunger and food insecurity measures are considered to have content validity because they were taken directly from the words that women who had first-hand experience with such food problems used to describe their experiences. The content validity of the items is based on an in-depth understanding of the phenomenon of hunger and food insecurity derived from the qualitative work of Dr. Radimer that led to development of the measures. Examination of the prevalence of positive responses to items led to elimination of three Radimer and three CCHIP items. Although the individual-level diet quality items appeared to have face and content validity, the prevalence of positive responses to the items suggested that respondents did not interpret the items which contained the word "should" as was intended, as the prevalence was substantially higher for these items than for their companion diet quality items. The two household anxiety items were not effective pairs because one item asked about a much more acute situation than its companion and was thus eliminated. For the CCHIP items, three were eliminated because they did not yield comparable prevalences to their companion items. Also, factor analysis not presented in this report indicated the CCHIP adult level items loaded on the household factor and thus lacked construct validity.

Factor analysis which assessed how the responses to items clustered together, confirmed the construct validity of the sets of items. Factor analysis of the 1993 survey indicated that there were four viable factors, according to the variance explained by the factors under varimax rotation. Measures were formed from these results and our conceptual framework.

The fourth way in which the validity of the combined Cornell and CCHIP measures was assessed was criterion-based. This research is unique in examining this important and often neglected aspect of validity. Many demographic variables that were expected to vary significantly by food insecurity status did so. Food insecure households and households with hungry children were significantly more likely to have lower incomes, less education, less full-time employment and more unemployment and greater participation in food assistance and income maintenance

significantly as food insecurity and hunger status worsened. A unique contribution of this research was the measurement of household food supplies, which confirmed a very strong relationship between the amount of food available and food insecurity status. Although 24-hour recall information was not significantly related to food insecurity status, intake of the nutrients found in good amounts in fruits and vegetables was significantly correlated with household availability and frequency of consumption of fruits and vegetables. These correlations indicate that for fruit and vegetable intake, all three dietary methods obtained convergent information.

The lack of a relationship between the 24-hour recall information and food insecurity status may be due to the high day to day variability in food intake that is characteristic of this type of data (Beaton et al., 1979). The household food inventories represented a "snapshot" of actual foods on hand, just as the 24-hour recalls represented a snapshot of one day's intake. However, the food inventory also encompasses information about usual dietary patterns as it includes all of the foods needed by all household members over periods of time that likely range from one to two weeks. Because the Cornell food insecurity items are based upon statements about food problems with positive response categories of "sometimes true" or "often true", they may elicit responses more reflective of usual food problems. Although the CCHIP items use yes/no responses, these items were presented in a 12-month and a 30-day time frame, long enough periods to reflect usual food intake. In this case, food insecurity status based on these measures would be expected to relate more highly to results from measures of usual dietary patterns than from 24-hour recalls. The significant association of food insecurity and hunger status with results from two of the methods of dietary assessment support the ability of the measures developed in this research to discriminate between progressive degrees of food insecurity and the more extreme condition of hunger in families with children.

One of the interesting observations in this research was the significant relationship between food insecurity status and the eating disorder score. Questions relevant to disordered eating patterns were included on the questionnaire because it was hypothesized that food insecurity might foster the development of disordered eating behaviors, particularly bingeing behaviors, that might predispose individuals to obesity in much the same way that repeated cycles of weight loss and regain make it more difficult for obese individuals to lose weight. The existence of such a relationship might contribute to an understanding of why obesity is found among hungry populations. The findings from this research are supportive of this relationship and require more focused inquiry to further test this hypothesis.

As the research described here was underway, USDA officials indicated a strong desire to develop measures that would identify hungry individuals, particularly adults, using the survey data

available. Because all the data needed were not available in a single survey, two approaches were explored: (1) adding two questions on hunger pangs and weight loss to the Cornell adult individual level insecurity measure and (2) adding those adults who had experienced the adult CCHIP items for 5 or more days in the past 30 days to the adult individual insecurity measure. Although the sample size of hungry adults was small using both approaches, both seemed to identify a group of hungry adult individuals. Further research at Cornell University using existing survey data will assist in determining whether 5 days is the appropriate cut-point. Determination of which of the two approaches is more valid will depend on analysis of CPS data.

As is true of any research, this project has some limitations. The most serious potential limitation lies in the non-response rate. Over half (52%) of the individuals selected into the sampling frame could not be found to solicit participation in the survey, with a disproportionate number of these in the more vulnerable strata. Of the half that was located, one-third refused participation. Despite the high non-response rate, a range of demographic characteristics was found in the sample, allowing a fair assessment of the effectiveness of the hunger and food insecurity measures. Because the results described in this report are based upon relationships between food insecurity status and risk factors and dietary consequences within the sample, the non-response rate does not negate the findings described in this report. The non-response rate, does, however, limit ability to make inferences to the population from which the sample was drawn and to make estimates of the prevalence of hunger and insecurity in this rural county. It is likely that the sampling frame resulted in many of the most vulnerable individuals being missed, so prevalence estimates based on these data would underestimate the percentage of hungry and food insecure households in this county.

Another limitation of this survey was collecting income information in categories rather than asking respondents to report actual income. This was done to minimize the number of people refusing to report income, but resulted in an inability to assess income relative to the poverty threshold and, consequently, eligibility for food assistance programs. Other characteristics of the sample that could not be derived without actual income figures were the percentage of income devoted to rent, utilities, medical expenses and food, findings with important policy implications.

Despite these limitations, this research has greatly enhanced understanding of the measurement of hunger and food insecurity. Testing the combined Cornell and CCHIP hunger and food insecurity measures in a more general population sample allowed a broadening of the conceptualization of food insecurity and hunger. In an at-risk group which is not experiencing overt hunger, the qualitative aspects of the diet are much more salient than in a more vulnerable sample where not having enough food to

eat subsumes concerns about the quality of the food available. This understanding led to a refinement in the construction of the measures used to assess the prevalence of hunger and food insecurity. These measures were effective in discriminating between individuals experiencing the various degrees of severity of food insecurity and hunger, at least in these women with children living at home. The majority of the demographic characteristics, food program participation figures and dietary measures, with the exception of the 24-hour recall, support this conclusion. Classifying individuals on the basis of household level food insecurity, individual level food insecurity and childhood hunger allows identification of households in a simple and straightforward manner who would benefit from different kinds of interventions.

Conclusions and Recommendations

The research results included in this report provide information that validates the ability of the combined Cornell and CCHIP hunger and food insecurity measures to differentiate between households and individuals experiencing progressive degrees of severity of the phenomenon. This research demonstrates that with a single measurement instrument, it was possible to include measures of the four domains of interest and policy relevance: household food insecurity, individual-level food insecurity, individual hunger, and severe (child) hunger. As described here, these measures can be used to accurately estimate prevalence of hunger and food insecurity.

The following questionnaire is strongly recommended for use in the Current Population Survey because, to our knowledge, it is the most comprehensive and extensively validated measurement instrument available. Beyond accurately capturing the substance of the phenomenon of interest, the measurement instrument pays strict attention to the form in which the items are communicated and understood. Initial qualitative research grounds the majority of the items in the modes of expression and ways of thinking of the groups in the population that are most likely to experience hunger and food insecurity. Furthermore, in the attached questionnaire, the Cornell items have been set in a last 30 day time frame based on USDA's strong suggestion of the policy relevance of this time frame.

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A Questionnaire to Estimate the Prevalence of Hunger and Food Insecurity

Now I'm going to read you a series of statements that people have made about their food situation. For the next eleven statements, tell me whether, over the past thirty days the statement is often true, sometimes true or never true for your household or the individuals in your household.

1. I worry whether my food will run out before I get money to buy more.
 Often true
 Sometimes true
 Never true

2. I worry about whether the food that I can afford to buy for my household will be enough.
 Often true
 Sometimes true
 Never true

3. The food that I bought just didn't last, and I didn't have money to get more.
 Often true
 Sometimes true
 Never true

4. I ran out of the foods that I needed to put together a meal and I didn't have money to get more food.
 Often true
 Sometimes true
 Never true

5. We eat the same thing for several days in a row because we only have a few different kinds of food on hand and don't have money to buy more.
 Often true
 Sometimes true
 Never true

6. I am often hungry, but I don't eat because I can't afford enough food.
 Often true
 Sometimes true
 Never true

7. I eat less than I think I should because I don't have enough money for food.
 Often true
 Sometimes true
 Never true

8. I can't afford to eat properly.
 Often true
 Sometimes true
 Never true

9. I cannot afford to feed my child(ren) a balanced meal because I can't afford that.
 Often true
 Sometimes true
 Never true
10. My child(ren) is (are) not eating enough because I just can't afford enough food.
 Often true
 Sometimes true
 Never true
11. I know my child(ren) is (are) hungry sometimes, but I just can't afford more food.
 Often true
 Sometimes true
 Never true

Now I'm going to read you a series of questions about the food situation of you and your household and other members of your household.

12. Thinking about the past year, did your household ever run out of money to buy food?
 Yes
 No (SKIP TO 14)
 DK (SKIP TO 14)
13. How many days in the past 30 days did your household run out of money to buy food?
Number of days_____
14. Sometimes people limit the kinds of food they use in order to make their food money go further. Thinking about the past year, did you ever rely on a limited number of foods to feed your children because you were running out of money to buy food?
 Yes
 No (SKIP TO 16)
 DK (SKIP TO 16)
15. In the past 30 days, how many days did you rely on a limited number of foods to feed your children because you were running out of money to buy food?
Number of days_____
16. Sometimes people lose weight because they don't have enough to eat. In the past year, did you lose weight because there wasn't enough food?
 Yes
 No
 DK
17. In the past year, have you had hunger pangs but couldn't eat because you couldn't afford food?
 Yes
 No
 DK

18. Thinking about the past year, did you ever cut the size of meals because there was not enough food in the house?

- Yes
- No (SKIP TO 20)
- DK (SKIP TO 20)

19. In the past 30 days, how many days did you cut the size of meals because there was not enough food in the house?

Number of days_____

20. Thinking about the past year, did you ever skip meals because there was not enough food in the house?

- Yes
- No (SKIP TO 22)
- DK (SKIP TO 22)

21. In the past 30 days, how many days did you cut skip meals because there was not enough food in the house?

Number of days_____

22. Thinking about the past year, did you ever eat less than you should because there was not enough money for food?

- Yes
- No (SKIP TO 24)
- DK (SKIP TO 24)

23. In the past 30 days, how many days did you eat less than you should because there was not enough money for food?

Number of days_____

24. Thinking about the past year, did you ever cut the size of your children's meals because there wasn't enough food in the house?

- Yes
- No (SKIP TO 26)
- DK (SKIP TO 26)

25. In the past 30 days, how many days did you cut the size of your children's meals because there wasn't enough food in the house?

Number of days_____

26. Thinking about the past year, did your children ever skip meals because there wasn't enough food in the house?

- Yes
- No (SKIP TO 28)
- DK (SKIP TO 28)

27. In the past 30 days, how many days did your children skip meals because there wasn't enough food in the house?

Number of days _____

28. Thinking about the past year, did your children ever say they were hungry because there was not enough food in the house?

Yes

No (SKIP TO 30)

DK (SKIP TO 30)

29. In the past 30 days, how many days did your children say they were hungry because there was not enough food in the house?

Number of days _____

30. Thinking about the past year, did any of your children ever go to bed hungry because there was not enough money for food?

Yes

No

DK

31. In the past 30 days, how many days did any of your children go to bed hungry because there was not enough money for food?

Number of days _____

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Cornell University, June 21, 1994

Table 1. Characteristics of Households in the Sample

Characteristic	Mean ± S.D.*
Women's Age	33.6 ± 6.8
Household Size	4.3 ± 1.3
	Percentage
Household composition	
Two parents with children	80
One parent with children	19
More than one family in house	1
Employment Status	
Women's	
Unemployed	36
Part-time	31
Full-time	33
Men's	
Unemployed	28
Part-time	17
Full-time	55
Women's Education	
< HS graduate	16
HS graduate	44
More than HS Education	41
Household Income	
<\$10,000	25
\$10,000-15,000	18
\$15,000-20,000	13
\$20,000-25,000	14
>\$25,000	37
Food Assistance Program Participation	
Food stamps	21
WIC	17
School lunch (Free or reduced price)	51
School breakfast	28

*Standard Deviation

N=193

Table 2. Percentage of Positive Responses to the Combined Set of Cornell and CCHIP Hunger and Food Insecurity Measures

	Cornell Item	CCHIP Item	Percent	Recommen- dation
Household Level Insecurity				
<u>Food Anxiety Component</u>				
I worry whether my food will run out before I get money to buy more	x		39.0	retain
Does your household ever run out of money to buy food? In the past 30 days? 5 or more days in the past 30 days?		x	35.1 11.1 5.0	retain
I worry about where the next day's food is going to come from	x		13.2	delete
<u>Qualitative Component</u>				
We eat the same thing for several days in a row because we only have a few different kinds of food on hand and don't have money to buy more	x		25.3	retain
Do you ever rely on a limited number of foods to feed your children because you are running out of money to buy food for a meal? In the past 30 days? 5 or more days in the past 30 days?		x	32.6 12.9 5.1	retain
<u>Quantitative Component</u>				
The food that I bought didn't last and I didn't have money to buy more	x		22.3	retain
I ran out of the foods that I needed to put together a meal and I didn't have money to get more	x		29.6	retain
Individual Level Insecurity				
<u>Qualitative Component</u>				
I can't afford to eat the way I should	x		22.6	delete
I can't afford to eat properly	x		23.2	retain
<u>Quantitative Component</u>				
I am often hungry but I don't eat because I can't afford enough food.	x		9.8	retain
I eat less than I think I should because I don't have enough money for food	x		14.8	retain
Do you ever cut the size of meals or skip because there is not enough food in the house? In the past 30 days? 5 or more days in the past 30 days?		x	24.0 11.7 5.9	delete

Table 2. Continued

	Cornell Item	CCHIP Item	Percent	Recommen- dation
Do you ever eat less than you should because there is not enough money for food? In the past 30 days? 5 or more days in the past 30 days		x	23.7 12.5 6.1	delete
<u>Child Qualitative Component</u>				
I cannot give my child(ren) a balanced meal because I can't afford that	x		15.1	retain
I cannot afford to feed my child(ren) the way I think I should.	x		26.9	delete
<u>Child Hunger</u>				
<u>Quantitative Component</u>				
My child(ren) are not eating enough because I just can't afford enough food	x		7.1	retain
I know my child(ren) are hungry some- times, but I just can't afford more food.	x		8.5	retain
Do your children ever eat less than you feel they should because there is not enough money for food? In the past 30 days? 5 or more days in the past 30 days?		x	13.1 6.6 2.3	delete
Do your children ever say they are hungry because there is not enough food in the house? In the past 30 days? 5 or more days in the past 30 days		x	7.0 5.0 2.8	retain
Do you ever cut the size of your children's meals or do they ever skip meals because there is not enough money to buy food? In the past 30 days? 5 or more days in the past 30 days		x	6.3 4.3 2.8	retain
Do any of your children ever go to bed hungry because there is not enough money to buy food? In the past 30 days? 5 or more days in the past 30 days		x	0.8 0.0 0.0	retain

Table 3. Factor Analysis with Orthogonal Rotation of the Combined Radimer and CCHIP Hunger and Food Insecurity Items*

	Factor 1	Factor 2	Factor 3	Factor 4
Household Insecure				
Worry food will run out	<u>0.57688</u>	0.20828	0.22833	0.15229
Household run out of money?	<u>0.65286</u>	0.20546	0.12282	0.11927
Eat the same thing for days	<u>0.56829</u>	0.21475	0.32974	0.14015
Rely on limited number of foods?	<u>0.59347</u>	0.31534	0.22886	0.06578
Ran out of the foods for a meal	<u>0.62886</u>	0.09371	0.30801	0.33118
Food didn't last	<u>0.57384</u>	0.14708	0.04045	0.47628
Individual Insecure				
I eat less than I think I should	0.41352	<u>0.55183</u>	0.43475	0.21899
I am often hungry	0.31434	<u>0.64685</u>	0.25303	0.12331
I can't afford to eat properly	0.37113	<u>0.25782</u>	<u>0.60392</u>	0.24205
Cannot give child balanced meal	0.35406	0.20661	<u>0.65770</u>	0.32388
Child Hunger				
Child(ren) are hungry sometimes	0.19167	0.32048	0.23646	<u>0.59489</u>
Child(ren) are not eating enough	0.18318	0.30475	0.26957	<u>0.66460</u>
Children say they are hungry?	0.12432	<u>0.57921</u>	0.06621	0.21217
Cut size or children skip meals?	0.17338	<u>0.58926</u>	0.10930	0.17772
Variance explained by each factor				
	Factor 1	Factor 2	Factor 3	Factor 4
	2.807644	1.971966	1.520070	1.496738

*The CCHIP item "Do your children ever go to bed hungry because there is not enough money to buy food" could not be used in the factor analysis because of very low prevalence

Factor loadings that are underlined load together on the specified factor.

Table 4. Reliability of the Combined Cornell and CCHIP Hunger and Food Insecurity Measures and with Each Item Deleted and Percent Insecure or Hungry Based on these Measures

Food Insecurity Status	Cronbach's alpha		Percent Insecure
	<u>Raw</u>	<u>Standardized</u>	
<u>Household Insecure</u>			
All items	0.86	0.86	56.7
Deletion of:			
Worry food will run out	0.83	0.83	52.3
Household run out of money	0.85	0.85	54.4
Eat the same thing for days	0.84	0.84	55.5
Rely on a limited number of foods	0.85	0.85	54.2
Ran out of the foods for a meal	0.82	0.83	55.4
Food didn't last	0.83	0.84	56.7
<u>Individual Insecure</u>			
All items	0.86	0.87	26.3
Deletion of:			
I eat less than I think I should	0.80	0.80	25.4
I am often hungry	0.86	0.86	25.8
I can't afford to eat properly	0.81	0.82	20.7
Cannot give child balanced meal	0.82	0.85	25.9
<u>Child Hunger</u>			
All items	0.71	0.63	16.2

Table 5. Proportion of Food Secure, Insecure and Hungry Households¹ with Selected Demographic Characteristics Based on the Combined Cornell and CCHIP Measures

	Secure	Insecure Household	Insecure Individual	Hungry Child
Income*				
<\$10,000	10.8	27.8	32.6	50.4
\$10,000-15,000	9.8	18.9	14.9	10.1
\$15,000-20,000	7.0	7.3	17.7	17.6
\$20,000-25,000	17.1	12.6	8.9	13.4
>\$25,000	53.7	33.4	25.8	8.6
Education*				
< HS graduate	10.3	19.4	23.0	17.4
HS graduate	40.4	39.3	49.2	55.2
> HS Education	49.3	41.4	27.8	27.4
Employment Status				
Female				
Unemployed	27.7	41.8	29.4	50.0
Part-time	23.8	20.7	32.9	30.4
Full-time	48.5	37.5	37.7	19.6
Male*				
Unemployed	13.9	32.6	46.1	38.6
Part-time	6.4	9.5	2.5	13.6
Full-time	79.7	57.8	51.4	47.8
Food Assistance Program Participation				
Food stamps*	7.8	25.7	38.6	35.1
WIC*	7.9	18.8	28.8	27.9
School lunch* (free or reduced price)	29.7	65.9	63.7	69.9
School breakfast*	18.5	29.5	27.9	53.3

¹Classification of food insecurity: HH Insecurity: positive answers to one or more household level items only; Individual Insecurity: positive answers to one or more adult and child quality items and adult quantity items, but not the child quantity items; Child Hungry: positive answers to one or more child quantity items

*Varied significantly by food insecurity status (see text)

Table 6. Proportion of Food Secure, Insecure and Hungry Respondents Reporting Income Instability and Reliance on Income Sources other than Wages

	Secure	Insecure Household	Insecure Individual	Hungry
AFDC*	3.9	19.1	24.9	21.0
Social Security	0.8	6.6	13.3	3.0
SSI*	1.1	7.8	11.3	20.2
Unemployment compensation	11.2	7.5	13.9	7.2
Child support	11.4	24.9	11.0	22.5
Workman's compensation	2.2	5.2	2.5	12.4
Income same month to month*	78.9	68.7	75.9	39.1
Income instability in past year	29.3	50.7	47.2	44.9
Reasons for income instability				
Job loss	16.0	27.3	38.7	18.2
Change in public assistance	0.0	3.5	2.5	3.0
Health problems	2.7	5.1	2.5	2.2
Loss of spouse*	1.2	1.4	2.8	3.0
Other	10.9	21.5	9.6	18.5

*Varied significantly by food insecurity status (see text)

Table 7. Monthly Household Expenses (in Dollars) of Food Secure, Insecure and Hungry Households

	Secure	Insecure Household	Insecure Individual	Hungry
Rent	281	271	225	247
Utilities	167	173	148	172
Automobile expenses	384	282	242	237
Child care	37	32	25	10
Medical insurance	103	112	25	34
Food	331	312	287	264
Total*	1321	1183	951	967
Food cost/household member	75	74	77	66
Medical expenses (past year)	866	640	625	374

*Varied significantly by food insecurity status (see text)

Table 8. Proportion of Food Secure, Insecure and Hungry Respondents Reporting Resources and Use of Coping Responses

	Secure	Insecure Household	Insecure Individual	Hungry
Garden	65.5	52.9	48.2	60.1
Hunt or fish	52.2	57.9	49.1	51.6
Belong to food buying club	13.8	17.5	13.7	16.7
Get free food from farm	28.8	25.1	4.4	24.9
Work odd jobs for extra cash	34.6	36.9	42.7	36.7
Have savings*	72.2	29.0	29.4	27.4
Can turn to others for financial help	81.8	86.1	75.4	67.3
Family	80.6	82.6	69.7	67.3
Friends	34.0	36.3	22.2	29.6
Neighbor	8.9	11.6	3.5	10.1
Church	25.2	26.7	18.0	34.0
Children eat meals with family				
Never	11.6	7.7	18.1	19.1
Sometimes	49.2	42.6	47.8	34.2
Often	49.1	49.7	34.2	46.8
Get food from family				
Never	53.9	50.0	54.9	47.3
Sometimes	37.1	37.8	35.4	37.6
Often	9.0	12.1	9.7	15.1
Borrow cash from family*				
Never	88.4	58.1	55.2	60.6
Sometimes	11.6	35.5	35.9	36.2
Often	0.0	6.1	9.0	3.1

*Varied significantly by food insecurity status (see text)

Table 9. Dietary Characteristics of Food Secure, Insecure and Hungry Households

	Secure	Insecure Household	Insecure Individual	Hungry Child
Frequency of Consumption(times/week)				
Fruit juice	5.3	6.3	3.5	5.0
Fruit*	6.3	3.6	3.4	2.5
Salad*	2.9	2.4	2.0	0.8
Potatoes	3.2	3.9	2.5	2.7
Carrots*	2.5	1.5	0.9	0.9
Vegetables*	8.1	7.2	7.4	5.5
Total*	28.4	24.9	19.8	17.3
Household Inventory (numeric score)				
Dairy*	5.0	4.1	4.0	3.6
Meat*	2.7	2.4	2.2	2.0
Grains*	12.6	11.6	10.2	9.9
Fruits*	8.7	7.4	5.7	5.8
Vegetables*	12.9	11.9	10.4	9.3
Total*	79.0	68.9	59.3	59.9
Eating Disorder Score*	4.8	5.2	5.1	5.5

*Varied significantly by food insecurity status (see text)

Table 10. Percentage with Positive Responses to Adult Level Items and Reporting Physical Symptoms Associated with Hunger and Food Insecurity in the 1988 Survey

	Households no children	with: children
I can't afford to eat properly	41.2	58.1
I am often hungry but I don't eat because I can't afford enough food	40.0	55.7
I eat less than I think I should because I don't have enough money for food	37.1	52.3
Did you lose weight in the past year because there wasn't enough food to eat	8.8	22.4
In the past year, have you had hunger pangs but couldn't eat because you couldn't afford to	17.1	19.0

Table 11. Identification of Hungry Adults¹ in the 1988 Survey Using Physical Symptoms, Validated Against Average Monthly Income and Expenses, Average Education and Percent Participating in Food Assistance Programs

	Secure (n=22)	Insecure Household (n=25)	Insecure Individual (n=32)	Hungry Adult (n=8)	Hungry Child (n=63)
Income*	2347	1551	1035	835	764
Expenses	322	294	284	266	220
Food expenditures*	324	272	218	170	243
Education (years)*	12.6	12.3	11.2	11.8	10.9
Program participation					
Food stamps*	18.2	32.0	62.5	75.0	73.0
WIC	36.4	60.0	74.2	75.0	63.9
School lunch (free and reduced price)*	14.3	20.8	41.4	37.5	68.3
Summer lunch	14.3	12.5	30.0	12.5	34.9
Cheese giveaway*	27.3	16.0	65.6	75.0	61.9
Emergency food assistance					
Food pantry*	4.5	16.0	28.1	37.5	36.5
Soup kitchen	0.0	0.0	0.0	0.0	7.9

¹Food insecurity categorization: Secure: answered negatively to all Cornell items; Household Insecure: answered positively to one or more household items only; Individual Insecure: answered positively to one or more adult level items or the child quality item; Adult Hunger: answered positively to one or more adult level items or the child quality item and answered positively to the two questions about the physical symptoms associated with food insecurity; Child Hunger: answered positively to one or both child diet quantity items

*Varied significantly by food insecurity status (see text)

Table 12. Percentage of Positive Responses to CCHIP Items Assessing Coping Tactics Useful in the Estimation of Adult Hunger

	Percentage
Do you ever cut the size of meals or skip meals because there is not enough food in the house?	24.0
In the past 30 days?	11.7
5 or more days in the past 30 days	5.9
Do you ever eat less than you should because there is not enough money for food?	23.7
In the past 30 days?	12.5
5 or more days in the past 30 days	6.1

Table 13. Identification of Hungry Adults¹ Using Adult Coping Tactics from CCHIP Items, Validated Against Demographic Characteristics

	Secure (n=80)	Insecure Household (n=41)	Insecure Individual (n=28)	Adult Hunger (n=9)	Adult Severe Hunger (n=5)	Child Hunger (n=30)
Income*						
<\$10,000	10.8	19.1	39.7	29.4	60.8	50.4
\$10,000-15,000	9.8	24.0	14.0	0.0	18.3	10.1
\$15,000-20,000	7.0	7.4	13.7	21.4	0.0	17.6
\$20,000-25,000	17.1	11.0	14.7	10.4	0.0	13.4
>\$25,000	53.7	38.5	17.9	38.8	20.8	8.6
Education*						
< HS graduate	10.3	18.4	22.1	19.1	32.5	17.4
HS graduate	40.4	35.9	59.5	11.8	67.5	55.2
> HS Education	49.3	45.7	18.4	68.0	0.0	27.4
Employment Status						
Female						
Unemployed	27.7	41.6	35.9	29.8	32.5	50.0
Part-time	23.8	21.1	31.4	23.9	18.3	30.4
Full-time	49.5	37.3	32.7	46.3	49.2	19.6
Male*						
Unemployed	13.9	25.9	56.2	29.4	41.9	38.6
Part-time	6.4	10.4	6.5	0.0	39.8	13.6
Full-time	79.7	63.7	37.3	70.6	18.3	47.8
Food Assistance Program Participation						
Food stamps*	7.8	27.7	30.5	19.1	65.6	35.1
WIC	7.9	18.1	28.8	21.4	19.0	27.9
School lunch* (free or reduced price)	29.7	63.0	66.7	64.0	79.1	68.9
School breakfast	18.5	25.6	36.7	20.9	32.5	53.3

¹Classification of food insecurity: HH Insecurity: positive answers to household level items only; Individual Insecurity: positive answers to adult and child quality items and adult quantity items; Adult Hunger: positive answers to Individual Insecurity items and reporting between 1 and 5 days of food insecurity to CCHIP adult items; Adult Severe Hunger: positive answers to Individual Insecurity items and reporting 5 days or more of food insecurity to CCHIP adult items; Child Hungry: positive answers to child quantity items

*Varied significantly by food insecurity status (see text)

Table 14. Identification of Hungry Adults¹ Using Adult Coping Tactics from CCHIP Items, Validated Against Dietary Characteristics

	Secure	Insecure Household	Insecure Adult, Child	Adult Hunger	Adult Severe Hunger	Child Hunger
Frequency of Consumption (times/week)						
Fruit juice	5.3	6.3	4.0	6.7	2.8	5.0
Fruit*	6.3	3.9	2.8	5.0	1.7	2.5
Salad	2.9	2.7	2.2	1.4	1.6	0.8
Potatoes	3.2	3.8	3.8	2.6	1.4	2.7
Carrots	2.5	1.6	1.1	0.7	0.4	0.9
Vegetables	8.1	7.7	6.4	8.9	5.0	5.5
Total*	28.4	26.0	20.2	25.3	12.9	17.3
Household Inventory (numeric score)						
Dairy*	5.0	4.2	4.0	4.4	2.8	3.6
Meat*	2.7	2.5	2.4	2.2	1.6	2.0
Grains*	12.6	11.6	10.6	11.1	9.8	9.9
Fruits*	8.7	7.1	6.3	8.6	4.3	5.8
Vegetables*	12.9	12.3	10.5	11.0	10.0	9.3
Total*	79.0	68.4	62.7	68.2	55.0	59.9
Eating Disorder Score*	4.7	5.0	5.5	5.1	5.1	5.5

¹Classification of food insecurity: HH Insecurity: positive answers to household level items only; Individual Insecurity: positive answers to adult and child quality items and adult quantity items, but not to child quantity items; Adult Hunger: positive answers to Individual Insecurity items and reporting between 1 and 5 days of food insecurity to CCHIP adult items; Adult Severe Hunger: positive answers to Individual Insecurity items and reporting 5 days or more of food insecurity to CCHIP adult items; Child Hungry: positive answers to child quantity items

*Varied significantly by food insecurity status (see text)

Table 15. Nested Prevalence of Food Secure, Insecure and Hungry Households¹ with Selected Demographic and Dietary Characteristics

	Secure	Insecure Household	Insecure Individual	Hungry Child
Income				
<\$10,000	10.8	35.2	42.4	50.4
>\$25,000	53.7	24.7	16.3	8.6
Education				
< HS graduate	10.3	19.7	19.9	17.4
> HS Education	49.3	34.4	26.6	27.4
Employment Status				
Unemployed (female)	27.7	41.8	40.8	50.0
Full-time	48.5	32.5	27.7	19.6
Unemployed (male)	13.9	37.4	42.0	38.6
Full-time	79.7	53.5	49.3	47.8
Food Assistance Program Participation				
Food stamps	7.8	31.3	36.7	35.1
WIC	7.9	23.6	28.3	27.9
School lunch (free or reduced price)	29.7	66.3	66.6	69.9
School breakfast	18.5	36.0	41.9	53.3
Frequency of Consumption(times/week)				
Fruit juice	5.3	5.4	4.3	5.0
Fruit	6.3	3.2	2.9	2.5
Salad	2.9	1.9	1.3	0.8
Potatoes	3.2	3.3	2.6	2.7
Carrots	2.5	1.2	0.9	0.9
Vegetables	8.1	6.8	6.3	5.5
Total	28.4	21.6	18.4	17.3
Household Inventory (numeric score)				
Dairy	5.0	4.0	3.8	3.6
Meat	2.7	2.3	2.1	2.0
Grains	12.6	10.8	10.0	9.9
Fruits	8.7	6.6	5.8	5.8
Vegetables	12.9	10.8	9.8	9.3
Total	79.0	64.2	59.6	59.9
Eating Disorder Score	4.8	5.3	5.3	5.5

¹Classification of food insecurity: HH Insecurity: all individuals answering positively to any item; Individual Insecure: all individuals answering positively to adult and child items; Child Hunger: individuals answering positively to one or both child diet quantity items

MEASUREMENT OF COPING BEHAVIORS AS AN ASPECT OF FOOD INSECURITY

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MEASUREMENT OF COPING BEHAVIORS AS AN ASPECT OF FOOD INSECURITY

Abstract

In this paper a conceptual distinction is made between intrahousehold behaviors and perceptions that point to insufficiency of food or food money and extrahousehold actions that respond to these insufficiencies. In the former category, perceptions refer to direct reports of the experience of food insufficiency due to a lack of money for food; behaviors refer to the handling of existing food resources in situations where there is little or no money for food -- rationing all members' food, or slightly less severe, differentially allocating food so that some members cut back on the amount of food consumed at each meal or skip meals entirely. Concerning the latter category, extrahousehold actions that respond to perceived food insufficiency could be called "coping behaviors," and refer to strategies seeking to expand food and food resources, such as relying on friends and extended family members, or on food pantries or even soup kitchens. This conceptual distinction holds that intrahousehold phenomena are indicators of hunger, that is, signs of food or food resource insufficiency due to constrained resources, while the extrahousehold phenomena constitute responses to resource-constrained food shortages. Taken together, intrahousehold handling of existing food resources and extrahousehold actions to expand food and food resources are indicative of a broader construct, namely, food insecurity. This paper, using survey data drawn from low income households with children, analyzes the degree of commonality among questionnaire items tapping phenomena on each side of the distinction made above. Results from factor analysis support the notion that items measuring intrahousehold handling of food and food resource insufficiency differ from items measuring extrahousehold "coping behaviors." The results are discussed in light of the ongoing search for a survey-based hunger measure, in which the authors call for conceptual discrimination between food insufficiency and food insecurity.

MEASUREMENT OF COPING BEHAVIORS AS AN ASPECT OF FOOD INSECURITY

If one wishes to conduct survey research on hunger for the purpose of estimating rates of its occurrence in a population of (non-homeless) low-income households, the immediate decision arises about which questionnaire items should be used to measure hunger. When reviewing work to date on the topic, one can identify a host of questionnaire items that capture different aspects of what might be deemed hunger. Which of the available items would serve best as core indicators of hunger? How ought one to decide?

To answer the second question first, selection of core hunger indicators depends upon the definition of hunger that guides a given research effort. In the present paper, the definition of hunger will be the one used by the Community Childhood Hunger Identification Project (CCHIP).¹ CCHIP operationalizes hunger as the experience of household food insufficiency owing to constrained resources. This definition can be further specified to encompass limited supplies of household food, alterations (cut-backs) in eating behavior, self-reports of hunger, and self-reports of underconsumption of food -- all within the context of constrained resources.

The CCHIP definition of hunger thus restricts the measurable experience of hunger to facets of food insufficiency that are centered within the household. Consequently, core indicators could gather information either about the household as an entire unit or about members of the household. Either way, only *intrahousehold behaviors and perceptions that involve experience with a limited food supply due to constrained resources* would count as core hunger items.

By implication, items which gather data about *extrahousehold phenomena* associated with resource-constrained food insufficiency would *not* be considered core hunger indicators. Such items involve strategies seeking to expand food and food resources, such as relying on friends and extended family members, on food pantries or even soup kitchens. These latter two items could be seen as proxies for hunger (c.f. Wehler, et al., 1991, p.46), and may well serve as data gathering instruments for research projects that do not have access to household-level interviews. Nonetheless, in the present paper, *intrahousehold items that reflect the direct experience with resource-constrained food insufficiency will be deemed primary candidates for core hunger indicators; items whose informational content concerns extrahousehold experiences related to food insufficiency will be termed coping*

behaviors. Because coping behaviors have been proposed elsewhere as candidates for hunger measures, the merits of their use as core indicators will also be weighed.

In this paper, using the CCHIP definition as a reference point, an examination of many extant questionnaire items will be undertaken in an effort to recommend core hunger indicators. First, the paper will explore in greater depth the distinction between intrahousehold and extrahousehold behaviors related to the experience of hunger, alluded to above. Then, after describing the data gathering methodology used in the CCHIP surveys that have yielded the data set to be employed in the present analysis, the paper will examine the face validity, content validity and construct validity of candidate items. The results will be discussed in light of the ongoing attempt to build a survey-based measure of hunger.

Coping Indicators versus Hunger Indicators

A consensus has developed around the definition of hunger in terms of food insecurity; food insecurity is understood as a condition of inadequate food, inadequate in amount or nutritional value, as well as a lack of access to such food through culturally normalized channels (Cohen and Burt, 1989, 1990; Radimer, et al., 1992; Morris, Neuhauser and Campbell, 1992 -- for a review of a number of key studies of food insecurity see Leidenfrost, 1993). The notion of food insecurity, however, contains no distinction between the undersupply of food in the household on the one hand, and the lack of normalized access to food on the other hand.

One of the aims of this paper is to argue that a difference should be made between intrahousehold experiences of and extrahousehold responses to food shortages. Intrahousehold behaviors and perceptions point to resource-constrained food insufficiency (an undersupply of food in the household or underconsumption of food by household members), while extrahousehold actions respond to food insufficiency (the actions being strategies that seek to add to the food supply or amount of food consumed, strategies that usually tap culturally non-normalized means of access).

Consider the former category, food insufficiency. The perceptions refer to direct reports of the experience of food insufficiency due to a lack of money for food; the behaviors refer to the management of existing food resources in situations where there is little or no money to replenish limited food supplies -- rationing all members' food, or slightly less severe, differentially allocating

food so that some members cut back on the amount consumed at each meal or skip meals entirely. Concerning the latter category, extrahousehold actions that respond to perceived food insufficiency refer to coping mechanisms whose aim is to bring in more food and food resources, mechanisms that involve turning to familial or communal resources, and to charitable or governmental food distribution programs.

What is being asserted here is that intrahousehold phenomena are indicators of hunger, that is, signs of food insufficiency due to constrained resources. Moreover, extrahousehold phenomena are conceived as attempts to cope with hunger, and so constitute responses to resource-constrained food shortages. Taken together, these intrahousehold phenomena (hunger) and extrahousehold phenomena (coping behaviors) are indicative of a broader construct, namely, food insecurity.

The present paper asserts that this distinction provides for a conceptual clarity that is useful in judging candidate items for the core indicators of hunger. Such a judgment can only be made from a particular (definitional) vantage point, and the one available for this paper is the perspective developed by CCHIP. The CCHIP perspective on defining hunger proposes a differentiation of intrahousehold from extrahousehold items based on two primary factors.

First, any definition of hunger that includes both intrahousehold food insufficiency items and extrahousehold coping behavior items does not allow one to distinguish insufficient food stores from sufficient food stores that have been laid in or augmented into sufficiency through culturally non-normalized channels. Said differently, households or individuals would be counted as hungry if they possessed sufficient food, but acquired it through non-normal channels, such as reliance on emergency food providers, friends or relatives, or means of access other than conventional ones. Conventional means of access have been defined as purchasing food at standard food outlets, relying on federal food assistance programs, or growing or hunting one's food supply (Radimer, et al., 1992).

When measured by a survey-based, multi-item scale, the scale (presumably) would count as "hungry" those households that had enough food, so long as the food or the money for it was borrowed by or given to them. The authors of this paper believe that in such a case, the measure's face validity would be called into question, and the prevalence estimate would likely be considered too high.

The issue is whether coping behaviors are to be counted as signs of hunger. This is because coping behaviors generally refer to non-normalized means of food acquisition. Focus groups conducted by researchers with CCHIP among low income persons and separately among food assistance service providers reveal a number of efforts to increase food supplies used by individuals experiencing food shortages (Wehler, 1986). Specifically, low income persons turn to support networks -- friends and relatives -- to seek food money, borrow food itself, or send children to eat at the homes of those in their support networks.² CCHIP focus groups also identified other means of food supply expansion. These efforts include relying on emergency food providers such as food pantries and soup kitchens. More recent, in-depth studies of families dealing with undersupplies of food have also documented use of emergency food services (Clancy and Bowering, 1992; Clancy and Poppendieck, 1991; Radimer, et al., 1990).

To summarize, the difference between coping and hunger is this: *coping behaviors* refer to strategies that respond to food shortages used by household members who go outside the household in an attempt to add to their food stores by acquiring food, meals or food money through culturally unconventional channels; *hunger* refers to perceptions and behaviors that indicate food insufficiency which include direct reports of inadequate food intake or household food shortages, and to behaviors that involve handling food or food resources to make them last longer, and this includes behaviors representing restricted food intake among household members. This is a difference in definition that makes a difference in validity to the authors of the present paper.

The second primary factor, beyond the problem of face validity, that led CCHIP researchers to distinguish intrahousehold from extrahousehold items has to do with the policy implications of hunger research. The CCHIP staff assumes that results of research using a survey-based measure of hunger would be used to help inform policy designed to mitigate hunger. An estimate of the prevalence of hunger that combines coping behaviors with food insufficiency behaviors would count reliance on federal food assistance programs as a culturally normalized means of food access (participation in federal programs, as the definition of food insecurity has developed, is not considered culturally marginalized). However, the use of such programs has become stigmatized (Waxman, 1983; Scott, 1987) which means that program participation is not normalized for many persons. And if, for the

sake of argument, reliance on federally funded food assistance programs were to be re-defined as non-normalized, then such a re-definition would rule out all forms of assistance other than a guaranteed income that persons could spend on groceries. Thus, a potential solution to hunger would be limited by the definition of hunger, leaving policy formation untenable.

Based on the two lines of reasoning stated above, the examination of candidate items for core indicators of hunger will maintain an intrahousehold and extrahousehold distinction. What this comes down to is a judgment by CCHIP researchers that coping behavior items have neither face validity nor policy-related usefulness for the concept of hunger, when hunger is defined as resource-constrained food insufficiency. Nonetheless, to explore the situation fully, both types of items will be examined empirically to assess their content and construct validity. The paper will turn next to discuss the methods employed by CCHIP to collect the survey data that make up the data set for the analysis. Following that discussion, the paper will commence examination of the face validity, content validity and construct validity of the candidate items.

Methods and Data Sources for This Study

The Community Childhood Hunger Identification Project uses a targeted, cross-sectional survey to document the prevalence of food insufficiency among low income families (defined as those with incomes at or below 185% of the federal poverty level) with at least one child under age 12.

The survey instrument contains a multi-item hunger scale as well as questions on the following

topics: household composition, socioeconomic information, shopping and eating patterns, strategies used to respond to food shortages, participation in various publicly funded programs, barriers to participation and household financial information, as well as the health status and school attendance patterns of a randomly selected child in the household.

The hunger index itself is a scale composed of eight questions, the responses to which indicate whether adults or children in the household are affected by perceived food insufficiency or altered food intake due to constrained resources. The eight items are listed in Table 1. The first two listed items capture aspects of food insufficiency as it affects the household as a whole (items H1 and H2), the next two items point to aspects affecting adults (items A1 and A2), and the remaining four items indicate food insufficiency among children (items C1 through C4). For each item, respondents indicate

ly, respondents from households are asked to report the number of days per month and the number of months per year of its occurrence.

(Table 1 about here)

Households are categorized as "hungry" (or food insufficient) if they experience at least five of the eight aspects, and households are categorized as "at risk of hunger" (or at risk of food insufficiency) if they experience from one to four of the aspects (Thomas, et al., 1989; Wehler, et al., 1992). This cutting point was initially based on findings from the pilot study in New Haven, Connecticut (Wehler, et. al, 1986), and was determined by plotting scale scores against a series of variables measuring risk factors. The cutting point analysis has been replicated in a demonstration project in the state of Washington (Wehler, et al., 1992), and again in seven study sites from locales across the nation (Wehler et al., 1991). It has also been replicated for the data set to be used in the present paper. In addition to the empirical support for this cutting point, by definition, a score of five or more means that for households to be classified as hungry, at least one of the aspects that directly affects the children has been experienced (since four of the eight hunger items pertain to the household's children). Finally, households are classified as "not hungry" (or food sufficient) if they have experienced none of the eight aspects.

Data for this study have been collected in five surveys conducted from May 1992 to July 1993. Table 2 displays information about the survey sites. The sites consist of three states (Utah -- May 1992 - October 1992, South Carolina -- July 1992 - April 1993, and Maine -- September 1992 - December 1992), a county (Rensselaer County, New York -- January 1993 - July 1993), and an eleven-county region of central Indiana (September 1992 - January 1993). Information from these five surveys has been combined into a composite data set for the current analysis.

(Table 2 about here)

The sampling procedure for each survey is designed to represent the population of low income families (at or below 185% poverty) with children (at least one child under age 12) in an entire state (Utah, South Carolina, and Maine), an entire county (New York site), or a group of counties (central Indiana). To do so, a two-stage, area probability sampling strategy with a standard cluster design has been employed at each site. Response rates among eligibles range from 65% in Indiana to 89% in

Table 1

Questions Providing Database for the CCHIP Hunger Scale

- H1 • Do you ever rely on a limited number of foods to feed your children because you are running out of money to buy food for a meal?
 - H2 • Does your household ever run out of money to buy food to make a meal?
 - A1 • Do you or adult members of your household ever cut the size of meals or skip meals because there is not enough money for food?
 - A2 • Do you or adult members of your household ever eat less than you feel you should because there is not enough money for food?
 - C1 • Do your children ever eat less than you feel they should because there is not enough money for food?
 - C2 • Do you ever cut the size of your children's meals or do they ever skip meals because there is not enough money for food?
 - C3 • Do your children ever say they are hungry because there is not enough food in the house?
 - C4 • Do any of your children ever go to bed hungry because there is not enough money to buy food?
-

Table 2

PARAMETER TABLE FOR FIVE CCHIP SURVEY SITES

PARAMETERS	MAINE	NEW YORK	INDIANA	SOUTH CAROLINA	UTAH
Site	State	Rensselaer County	11 counties in Central IN	State	State
Region	New England	Mid-atlantic	East North Central	South Atlantic	Mountain
Dates of survey	9/92-12/92	1/93-7/93	9/92-1/93	7/92-4/93	5/92-10/92
Target Pop. (N)	38,255	2,259	28,309	105,859	64,469
Sampling Fraction	1%	15%	1%	.4%	1%
Sample Design	2-stage probability	2-stage probability	2-stage probability	2-stage probability	2-stage probability
PSU	block groups	block groups	block groups	block groups	block groups
Number of HH Enumerated	21,069	12,205	19,990	23,478	17,280
Completion Rate among eligibles	76%	73%	65%	69%	89%
Refusal Rate among contacts	6%	11%	12%	6%	3%

Utah. The composite data set represents noncontiguous areas and is not formulated in such a way that it can provide estimates of population parameters; sample statistics only will be reported in the analysis.

Hour-long, face-to-face interviews have been conducted in homes of the respondents. The number of eligible, low-income families interviewed at each site varies, from a low of 341 in the New York site to a high of 667 at the Utah site, with 385 interviewed in Maine, 400 in Indiana, and 418 in South Carolina. All told, respondents from 2211 families have been interviewed.

Overall, 427 households are found to be food insufficient, 1200 are found to be at risk of food insufficiency, and 573 are found to be food sufficient (with nine cases having been deleted due to missing data). Table 3 contains sociodemographic information that profiles the 427 hungry or food insufficient households. Among the more striking characteristics, nearly four in ten (39%) are headed by women, over three-fifths (63%) are white, almost two-thirds (65%) have wage income, and the average income is at 85 percent of the poverty line. Food assistance program participation ranges from 29 percent in WIC, through 52 percent in Food Stamps, to 75 percent in the School Lunch Program. On average, hungry households spend just over one-third of their gross income on food, which amounts to 82 cents per person per meal; this is 81 percent of the Thrifty Food Plan.

(Table 3 about here)

Handling of Intrahousehold Food Resources: CCHIP Indicators of Food Insufficiency

The conceptual framework used in this study hypothesizes the root cause of food insufficiency (hunger) in the United States to be resource insufficiency (poverty) (Wehler et al., 1986, 1992). At the household level, this would mean a shortage of food stores and of resources for replacing food-stuffs as they are consumed. At the individual level, this would mean perceptions of inadequate intake and altered eating practices, including cutbacks in the amount eaten at meals and skipping meals altogether. Data from the five survey sites reveal how these signs of perceived food insufficiency attributed to constrained resources manifest themselves.

Before conducting the validity assessment of other questionnaire items, consider first the CCHIP hunger items. Among the strongest candidates for core hunger indicators that CCHIP researchers know of are the eight questions that comprise the CCHIP scale. For use in a general popu-

Table 3

**Profile of Hungry Households
(n=427)**

Hungry Households from the CCHIP surveys had the following characteristics in common:

- These households have an average of 4.5 members, of whom 2.7 are children.
 - Almost four in ten (39.1%) are headed by women.
 - 63.0% are white.
 - 78.9% have at least one adult member with a high school diploma.
 - 65.1% have wage income.
 - 29.6% receive benefits from Aid to Families with Dependent Children.
 - The average income of hungry households is at 84.9% of the poverty line.
 - Hungry households spend an average of 47.0% of their gross income on shelter costs.
 - Hungry households spend an average of 34.3% of their gross income (including food stamps and WIC benefits) on food. This amounts to 82 cents per person per meal, and is 81.0% of the Thrifty Food Plan.
 - 51.5% are eligible for and participating in the Food Stamp Program.
 - Among hungry households that are categorically and income eligible for WIC benefits, 28.6% are participating.
 - 75.2% of hungry households with school-age children participate in the School Lunch Program, while just over a third (34.4%) participate in the School Breakfast Program.
-

lation survey, however, these items have drawbacks as well as virtues. Their virtues come from their repeated use and testing, having been applied in numerous surveys already. This has given CCHIP researchers the opportunity to see how the items work. The items have shown themselves to be reliable and valid (see the entry in this compendium by Wehler, et. al). Their drawback is that some of the items and the scale itself have been developed for a targeted population (households with children). Thus, the scale cannot be used in its entirety for a general population survey.

Even though the CCHIP index cannot be used in toto for all households, it is instructive to see how the indicators that make up the scale function. Such an examination can set a context to aid in assessment of content validity or other potential indicators. Begin by examining Table 4.

(Table 4 about here)

Table 4 displays a principal components factor analysis of CCHIP hunger items. The factor loadings at the top of the table are from the unrotated factor pattern. Two factors are retained from the initial factor analysis, using as a criterion Eigenvalues of 1.0 or greater. (A factor with an Eigenvalue of greater than 1.0 explains more than a random share of the variance.) Third and subsequent Eigenvalues were 0.66 and lower. The factor loads in Factor 1 range from .54 to .79, which demonstrates good coherence among the eight items. The rotated factor pattern at the bottom of Table 4 illustrates that two factors emerge. The first is a "child hunger" factor that subsumes the four items (C1 through C4) pertaining to the experience of food insufficiency among children in the household. The other factor taps an adult/household dimension of the experience of food insufficiency, pertaining to items about adults (A1 and A2) or about the household as an entire unit (H1 and H2).

The results in Table 4 make it evident that the CCHIP scale exhibits content validity. That is, the items "hang together," and as a unit they reveal an underlying dimension of some phenomenon. What that phenomenon is called depends on the informational content of the items which scale together. In this case, those items ask about intrahousehold experiences of insufficient food, what the authors of this paper are calling hunger. With further analysis, it is possible to clarify the pattern of hunger experiences that is disclosed by the CCHIP indicators.

Frequencies of positive responses to the CCHIP indicators of hunger establish a pattern of behavior involving awareness of resource insufficiency, food intake deficits, and rationing strategies.

Table 4
Principal Components Factor Analysis of CCHIP Hunger Items
CCHIP Sites, 1992-93. (n=2204)

FACTOR PATTERN

<i>Item</i>	<i>Factor 1</i>	<i>Factor 2</i>
(Eigenvalue)	(4.046115)	(1.301915)
CCHIP Hunger Scale Items		
H1 HH Ever Rely on "Emergency" Foods	.59124	.46346
H2 HH Ever Run Out of Money for Food	.65180	.39528
A1 Adults Ever Cut Size or Skip Meals	.77719	.38615
A2 Adults Ever Eat Less Than They Should	.76639	.37480
C1 Children Ever Eat Less Than Should	.79311	-.37780
C2 Children Ever Cut Size or Skip Meals	.76874	-.38320
C3 Children Ever Report Hunger	.75494	-.35723
C4 Children Ever Go To Bed Hungry	.53890	-.47339

ROTATED FACTOR PATTERN

<i>Item</i>	<i>Factor 1</i>	<i>Factor 2</i>
(Eigenvalue)	(2.681764)	(2.666267)
CCHIP Hunger Scale Items		
H1 HH Ever Rely on "Emergency" Foods	.09246	.74553
H2 HH Ever Run Out of Money for Food	.18348	.73988
A1 Adults Ever Cut Size or Skip Meals	.27883	.82182
A2 Adults Ever Eat Less Than They Should	.27917	.80616
C1 Children Ever Eat Less Than Should	.82879	.29133
C2 Children Ever Cut Size or Skip Meals	.81531	.27032
C3 Children Ever Report Hunger	.78721	.27901
C4 Children Ever Go To Bed Hungry	.71592	.04430

A careful examination of households experiencing resource-constrained food shortages will lay bare this pattern. As noted above, of the 2202 households with complete information in the composite sample, 427 respond positively to five or more of the eight hunger items and so are classified as food insufficient. Table 5 contains information about these households, depicting their responses to individual items from the set of hunger indicators. The eight hunger items are listed in Table 5 in order of most common to least common indications of food insufficiency.

(Table 5 about here)

Facing limited resources, nearly all hungry families (99%) report that they turn to a few, low-cost foods, such as tubers, noodles and grains. The next most prevalent behaviors in hungry households involve adults -- food is rationed such that adults cut the size of their meals or skip them completely (occurring in 97% of hungry households), with adult members affirming that they are eating less than they feel they should due to lack of food money (95% of hungry households). Respondents from more than nine in ten hungry households (93%) remark that they have completely run out of money to make a meal. Next most typical is parents noticing that their children are eating less than the parents feel the children should (in 82% of hungry households), with parental respondents in over 75 percent of hungry households finding themselves forced to cut the size of their children's meals or have the children skip meals because there is not enough money for food. When there is little food in the house to give them, children tell their parents that they are hungry (75% of hungry households). Finally, little food or money for food can mean that children go to bed hungry (in 26% of hungry households).

This pattern emerges as a recurrent and chronic tendency. During the 30 days prior to the interview, on average, respondents from hungry households say that each of these hunger indicators had occurred for at least six days, or nearly so (except for children going to bed hungry which averages more than four and a half days). Moreover, each of these experiences of food insufficiency averages at least six months of the previous twelve. It is quite striking to see that for all eight hunger indicators, taken separately, more than one quarter of hungry households had experienced each of these every month in the twelve months prior to the interview.

These findings depict an experience of periodic food shortages, marked by relying on limited,

Table 5

**Patterns of Food Insufficiency in the Household
Among Hungry Families in the CCHIP Sites, 1992-93.
(n=427)**

	Percent Yes	Avg. # days in past 30 days	Avg. # months in past 12	% HHs with problem all 12 months
THINKING ABOUT THE PAST 12 MONTHS:				
Did you ever rely on a limited number of foods to feed your children because you were running out of money to buy food for a meal?	98.8%	8.9	8.0	46.2%
Did you or adult members of your household ever cut the size of meals or skip meals because there was not enough money for food?	97.2%	8.1	7.2	37.2%
Did you or adult members of your household ever eat less than you felt you should because there was not enough money for food?	94.6%	7.5	6.9	34.4%
Did your household ever run out of money to buy food to make a meal?	92.7%	5.9	6.8	32.4%
Did your children ever eat less than you felt they should because there was not enough money for food?	82.0%	6.2	6.6	32.6%
Did you ever cut the size of your children's meals or did they ever skip meals because there was not enough money for food?	75.9%	6.5	6.6	33.0%
Did your children ever say they were hungry because there was not enough food in the house?	75.9%	5.9	6.5	32.1%
Did any of your children ever go to bed hungry because there was not enough money to buy food?	26.2%	4.7	6.2	25.5%

emergency fare, rationing food by skipping meals and differentially allocating food, more commonly cutting adults' amounts and slightly less typical, cutting children's amounts. Keeping this context in mind, the task at hand is to evaluate the validity of questionnaire items available for a general population survey of households on hunger.

Intrahousehold Indicators of and Extrahousehold Responses to Food Insufficiency

Recall that previous research has identified a number of "coping behaviors" used by low income people to expand their food and food resources when resource limitations occur. A comprehensive list of these strategies was used to construct additional items for the core CCHIP Community Questionnaire. Data have been collected both on items that measure extrahousehold responses to hunger -- what are being called coping behaviors in this paper -- and on intrahousehold items that indicate food insufficiency -- putative hunger items that are not in the CCHIP hunger scale. Table 6 lists both sets of these items as they appear on the current, expanded version of the CCHIP Questionnaire.

(Table 6 about here)

Intrahousehold "hunger indicators" (not part of the CCHIP scale) contained in Table 6 are items 1 through 6 (buying and serving less expensive foods, buying and serving less nutritious foods, adults eating something different from the children, not giving children or adults a balanced meal, and diluting infant formula) and item 13 (juggling bills to have more money for food). The extrahousehold "coping behaviors" in Table 6 are items 7 through 9 (borrowing money for food or food itself, or going to or sending children to the homes of others for meals), items 10 and 11 (getting food from a food pantry or meals from a soup kitchen), and items 12, 14 and 15 (buying food on credit, getting discarded or left-over food, or some other way of getting food).

To see results about these items, examine Table 7 which presents information about these items taken from all interviewees in the composite sample, and separately for each of the three CCHIP hunger status groups -- those reporting no hunger, those at risk of hunger, and hungry families. The percentage of households who have ever engaged in a particular behavior is shown as well as the mean number of times the behavior occurs per month.

(Table 7 about here)

Table 6

Questionnaire Items Providing Database for Intrahousehold Indicators of Hunger and Extrahousehold Responses to Hunger

People do different things to stretch their food or food money when they are running short of money. Thinking about the past 12 months, please tell me how often you did each of the following things:

1. How often did you buy and serve less expensive foods?
2. How often did you buy and serve foods that were not as nutritious as you would like because you were trying to stretch your food money?
3. How often did you feed your child(ren) a meal but you ate something else to make sure they got the food they needed?
4. How often were you not able to give your child(ren) a balanced meal because you could not afford it?
5. How often did you (or other adult members of your household) not eat balanced meals because you could not afford to eat that way?
6. [IF CHILD UNDER 2] How often did you dilute your child(ren)'s formula or substitute Kool-Aid or sugar water?

People sometimes go to others to get enough food to go around when they are running short of money. Thinking about the past twelve months, please tell me how often you did each of the following things:

7. How often did you borrow money for food from friends or relatives?
8. How often did you get food from friends or relatives?
9. How often did you go or send the children to the homes of friends or relatives for meals?

People sometimes go to different places to get enough food to go around when they are running short of money. Thinking about the past 12 months, please tell me how often you did each of the following things:

10. How often did you get food from a food pantry?
11. How often did you get meals from a soup kitchen or church?

People do different things to have enough food to go around when they are running short of money. Thinking about the past 12 months, please tell me how often you did each of the following things:

12. How often did you buy food on credit?
 13. How often did you choose not to pay bills on time so that you had money to buy food?
 14. How often did you get food that was left-over or discarded by others such as stores, restaurants, schools or other people?
 15. How often did you maybe get food some other way; what other way did you get food?
-

Table 7

Extent and Frequency of Use of Extrahousehold Responses to Hunger and Intra-household Behaviors Indicating Hunger in the CCHIP Sites, 1992-93.

Hunger Adjustment Strategy	All interviewees (n=2202)		No hunger (n=573)		At risk of hunger (n=1200)		Hungry (n=427)	
	Ever use (%)	Mean use*	Ever use (%)	Mean use	Ever use (%)	Mean use	Ever use (%)	Mean use
Buying and serving less expensive food	90.9	3.46	74.1	2.39	96.0	3.71	98.8	4.21
Buying and serving less nutritious food	66.1	1.68	31.9	0.50	72.5	1.69	93.4	3.23
Adults eating differently than child(ren)	57.7	1.70	15.4	0.30	65.4	1.81	92.7	3.27
Not serving child(ren) balanced meal	45.4	0.98	5.8	0.08	47.2	0.78	93.4	2.74
Not serving adult(s) balanced meal	57.2	1.49	8.2	0.10	66.5	1.52	97.2	3.29
Diluting infant's formula	4.2	0.11	1.4	0.02	4.5	0.11	6.8	0.22
Borrowing money for food	48.2	0.62	16.4	0.16	55.5	0.65	70.5	1.16
Getting food from friends or relatives	51.1	0.72	23.0	0.31	56.9	0.75	72.8	1.19
Sending children to or eating at friends or relatives	20.1	0.36	5.1	0.07	21.1	0.35	37.7	0.77
Getting food from food pantry	26.5	0.21	11.7	0.08	27.6	0.21	43.3	0.38
Getting meals at soup kitchens	5.4	0.05	1.7	0.02	5.1	0.04	11.5	0.12
Buying food on credit	8.0	0.13	5.8	0.09	7.9	0.11	11.5	0.24
Not paying bills on time	67.3	0.98	36.9	0.35	74.0	1.05	89.9	1.64
Getting discarded or left-over food	10.8	0.16	4.7	0.07	10.3	0.15	20.4	0.30
Other means of getting food	40.9	0.93	39.0	1.11	42.9	0.90	38.0	0.77

* Number of times per month

Among the notable findings in the first pair of columns in Table 7 one can observe that, overall, nearly nine in ten respondents stretch their food resources by buying and serving less expensive foods. This particular action is hardly unique to low-income households, representing instead a common management strategy also used by middle-income families. Not so common among the middle class are the remaining strategies. To stretch food money two-thirds of the respondents report buying and serving less nutritious foods, with nearly three-fifths reporting that adults eat something different than the children eat, and a like number report that adults are not eating balanced meals when food money is short. Just under half of the households say that they are unable to serve the children a balanced meal when money is tight.

Following down columns one and two, members of low-income households report relying on social support networks when food money is short, with nearly half turning to friends and relatives to borrow money for food and more than half borrowing food. One in four get groceries from a food pantry and one in twenty get meals from a soup kitchen. Over two-thirds choose not to pay bills on time in order to have money for food, and more than ten percent get discarded or left-over food. Moreover, looking at the last three pairs of columns in Table 7, it becomes apparent that the frequency of reliance on these methods varies directly with hunger status.

For each and every strategy, except the "other ways of getting food" category, the frequency of reliance is highest for hungry households, next highest for households at risk for hunger, and lowest for households without hunger. This is so whether frequency of use is understood as the percentage of households that have ever used a given strategy, or as the mean number of times the strategy is used per month.

Relationship Between Intrahousehold and Extrahousehold Indicators

Earlier in the paper misgivings by CCHIP researchers were made plain about the face validity of using items that tap extrahousehold experiences with a limited food supply in representing the concept of hunger. Yet, the results presented in Table 7 make it equally plain that both the non-CCHIP intrahousehold items and the extrahousehold items exhibit a close association with the CCHIP hunger index. This raises a question as to whether all these behaviors are empirical markers of hunger -- that is, behaviors indicating the presence of food insufficiency. To answer this question, a

principal components factor analysis is conducted of the eight CCHIP hunger scale items, the eight extrahousehold adjustment mechanisms or "coping behaviors," and the seven other intrahousehold adjustment mechanisms that are not part of the CCHIP hunger scale. See Table 8.

(Table 8 about here)

Table 8 shows factor loads, retaining the five factors that have Eigenvalues greater than 1.0. (Recall that a factor with an Eigenvalue of greater than 1.0 explains more than a random share of the variance.) The factor coefficients that appear in bold print are those which load onto the primary factor, each having a value of .55 or greater. Note that the only items which load are those representing intrahousehold behaviors and perceptions that could be said to point to food insufficiency. Seven of the eight CCHIP hunger scale items load, the exception being that item which has the smallest frequency -- children going to bed hungry. In addition, five of the seven other intrahousehold hunger adjustment mechanisms that are not part of the CCHIP scale load onto this factor. The two that do not load on the primary factor have extreme frequencies -- buying and serving less expensive foods being over ninety percent and diluting infant formula being under five percent.

Three conclusion can be drawn from Table 8. First, the findings reinforce an important feature about the CCHIP hunger index -- it is integral. The integrity or coherence of the scale is evident in the factor analysis of the CCHIP scale items shown previously in Table 4, and the scale's integrity is apparent, impressionistically, from the results shown in Table 5. In Table 8 the coherence of the CCHIP scale is affirmed, because all of the items except one load onto the primary dimension. The lone exception is the item pertaining to the respondent's report of the child(ren) going to bed hungry. The frequency of occurrence among hungry households is much lower for this item then for the other

Table 8
Principal Components Factor Analysis: Unrotated Factor Pattern of CCHIP Hunger Scale Items, Other Intrahousehold Indicators of Hunger and Extrahousehold Responses to Hunger. CCHIP Sites, 1992-93. (n=2200)

<i>Item</i>	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>	<i>Factor 5</i>
(Eigenvalue)	(7.17344)	(1.69218)	(1.34121)	(1.24524)	(1.16020)
CCHIP Hunger Scale Items					
HH Ever Run Out of Money for Food	.65552	.12851	.08566	-.24302	-.00533
HH Ever Rely on "Emergency" Foods	.64461	.27209	-.17978	-.07043	.01289
Adults Ever Eat Less Than They Should	.75057	.03630	-.14112	-.25176	.05519
Adults Ever Cut Size or Skip Meals	.76971	.05942	-.15720	-.22883	.03208
Children Ever Report Hunger	.64662	-.50299	.02638	.08111	-.06495
Children Ever Eat Less Than Should	.66674	-.56552	-.01281	.02327	-.07772
Children Ever Go To Bed Hungry	.45865	-.47377	.14770	.19811	-.01902
Children Ever Cut Size or Skip Meals	.64333	-.55685	-.01879	.01491	-.09126
Other Items Indicating Adjustment to Hunger					
Buying/Serving Less Expensive Foods	.44140	.32809	-.24717	.32098	.18836
Buying/Serving Less Nutritious Foods	.66960	.16717	-.23623	.15452	.08450
Adults Eating Differently Than Children	.71831	.18482	-.14078	-.10025	.03971
Not Serving Children Balanced Meal	.77437	-.08217	-.14636	.10182	.05774
Not Serving Adults Balanced Meal	.81709	.15366	-.21193	-.03894	.08061
Diluting Infant's Formula	.14380	.06407	.24725	-.03831	.20342
Borrowing Money for Food	.52735	.21205	.39884	-.20547	-.25331
Getting Food from Friends/Relatives	.47040	.33598	.44615	.12134	-.27034
Sending Children/Eating with Others	.39301	.17913	.46059	.10131	-.33246
Getting Food from Food Pantry	.33793	.04446	.40286	-.06844	.51820
Getting Meals at Soup Kitchens	.18937	-.07487	.37066	.04702	.67191
Buying Food On Credit	.16274	-.02444	.06219	.49943	-.16583
Not Paying Bills On Time	.58227	.23590	-.07119	.05491	-.17560
Getting Discarded Food	.26198	.05037	.23742	.42103	.01072
Other Means of Getting Food	-.01843	.17005	-.18568	.60396	.12390
Proportion of Variance Explained	.3119	.0736	.0583	.0541	.0504
Total Proportion of Variance Explained = .5483					

to the CCHIP hunger scale for specific reasons.

"Buying and serving less nutritious foods," "not serving children balanced meal" and "not serving adults balanced meal" do not indicate an insufficient amount of food, the concept for which the CCHIP hunger scale is designed. "Adults eating differently than children" does not convey whether adults are eating less than their children due to constrained food money, and again, it is food insufficiency that the CCHIP hunger scale seeks to measure. Finally, "not paying bills on time," presumably has as its aim preserving in a given month some household funds for food that would otherwise have paid a non-food debt had there been adequate money. Although it is an intrahousehold strategy that pertains to resource constraints, the resource management technique that it asks about is broader than food resources, per se, and is deemed to be an indicator of income insufficiency (poverty) rather than food insufficiency (hunger).

The third conclusion to be drawn from the figures in Table 8 is that indicators of coping behavior (extrahousehold responses to food insufficiency) and indicators of hunger (intrahousehold measures of an insufficient food supply and food intake deficits by household members) do not occupy the same dimensional space; therefore, coping behavior indicators and hunger indicators empirically tap distinct phenomena.

Recall that the analysis contained in Table 8 has five factors. To see more clearly the separate factors, an orthogonal transformation has been performed, retaining these five factors. The results are displayed in Table 9.

(Table 9 about here)

The rotated factor pattern exhibited in Table 9 shows that ten items load onto factor 1 (based on having values of .55 or greater). Included are the four CCHIP hunger scale items that pertain to the household as a whole or to the adults in the household, and the intrahousehold adjustment strategies of buying and serving less expensive foods, buying and serving less nutritious foods, adults eating differently than children eat, adults not serving children or themselves balanced meals, and juggling bills. This factor would seem to subsume an underlying dimension of household/adult hunger experiences. Next, four items load onto factor 2, all of which are CCHIP hunger scale items pertaining to children -- a childhood hunger factor emerges clearly, here. Factor 3 involves a dimension of reliance

Table 9
Principal Components Factor Analysis: Rotated Factor Pattern of CCHIP Hunger Scale Items, Other Intrahousehold Indicators of Hunger and Extrahousehold Responses to Hunger. CCHIP Sites, 1992-93. (n=2200)

<i>Item</i>	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>	<i>Factor 5</i>
CCHIP Hunger Scale Items					
HH Ever Run Out of Money for Food	.56442	.19148	.31147	.17600	-.17153
HH Ever Rely on "Emergency" Foods	.70283	.06339	.16097	.03940	.03928
0Adults Ever Eat Less Than They Should	.71371	.29265	.12050	.11516	-.16793
Adults Ever Cut Size or Skip Meals	.73846	.28679	.13594	.09075	-.14074
Children Ever Report Hunger	.28454	.76549	.09949	.06340	.04192
Children Ever Eat Less Than Should	.30237	.82079	.06504	.03563	-.02152
Children Ever Go To Bed Hungry	.07927	.66437	.10878	.12948	.14135
Children Ever Cut Size or Skip Meals	.28989	.80220	.06363	.01760	-.03068
Other Items Indicating Adjustment to Hunger					
Buying/Serving Less Expensive Foods	.54899	-.06522	-.02688	.09369	.43236
Buying/Serving Less Nutritious Foods	.67850	.17833	.05798	.05931	.25315
Adults Eating Differently Than Children	.71789	.16985	.16833	.09499	.00089
Not Serving Children Balanced Meal	.63167	.44549	.08793	.10167	.16119
Not Serving Adults Balanced Meal	.80979	.24212	.11814	.10376	.07130
Diluting Infant's Formula	.05444	.00362	.12534	.33128	-.01831
Borrowing Money for Food	.32220	.11385	.65364	.12493	-.16999
Getting Food from Friends/Relatives	.24747	.02355	.72074	.11741	.16113
Sending Children/Eating with Others	.11740	.12535	.68977	.05728	.10454
Getting Food from Food Pantry	.16835	.08410	.11413	.70898	-.02423
Getting Meals at Soup Kitchens	.01836	.10476	-.07872	.78105	.07061
Buying Food On Credit	-.00973	.18349	.18403	-.09066	.48170
Not Paying Bills On Time	.55052	.10882	.31083	-.07098	.13051
Getting Discarded Food	.04984	.14977	.26304	.17272	.42541
Other Means of Getting Food	.04686	-.11192	-.14375	-.02425	.63865
Variance Explained	4.980177	3.002894	1.917795	1.417589	1.293816

on friends and relatives for food and food money, with three such items loading. Factor 4 has two items that load upon it, both of which refer to reliance on emergency food providers. The fifth factor displays a separate "other means of getting food" dimension.

These five factors designate distinct and intuitively understandable categories of behaviors that figure into the measure of food insufficiency and responses to it. Evidently there is an adult/household dimension of hunger that encompasses perceptions of household food and food resource shortages, behaviors that attempt to handle these shortfalls, and of reductions in food intake primarily among adults. There is a child hunger dimension that subsumes direct reports of hunger among children as well as perceived cutbacks in their food intake. There is a dimension that gets at reliance on a social support network outside the household-- friends and extended family -- to provide expansion of food or food money. There is a dimension that intimates use of emergency food providers, again outside the household, in which expansion of the food or meal supply is sought. And finally, there is a dimension that points to other means of getting food.

The results in Table 9 help clarify the differences between the indicators of intrahousehold food insufficiency -- the eight hunger scale items used by CCHIP and six of the other intrahousehold measures of food insufficiency -- and the extrahousehold strategies relied upon to respond to food insufficiency. To be specific, items that measure "coping behaviors" involving reliance on a social support network to acquire more food money, additional food itself or extra meals (Factor 3), and involving reliance on emergency food providers (Factor 4) form separate dimensions from items that measure food insufficiency either among adults or in the household at large (Factor 1) or among children in the household (Factor 2). The importance of this finding will be discussed in the conclusion.

Conclusion

In summary, one of the main conclusions to be drawn from these results is that coping behaviors are not indicators of hunger. This conclusion is important because it is a common practice to group together coping and hunger indicators as if they tap the same underlying phenomena. Indeed, it is not difficult to see why coping behaviors seem to reflect hunger. At first glance items measuring coping behaviors appear to be synonymous with items measuring food insufficiency. The strong association between the CCHIP food insufficiency scale and the items measuring coping (extrahouse-

hold responses to food insufficiency), for example, shows that the two concepts co-vary.³

Even though indicators of "coping" appear to be tantamount to indicators of "hunger," they are not. Judging from the factor analysis, intrahousehold behaviors and perceptions which, arguably, measure hunger (food insufficiency) are not synonymous with extrahousehold responses to hunger (food insufficiency). Acquisition of food through non-normal media can be taken as a marker of food insecurity, however, and this is unquestionably and strongly associated with hunger. But even though extrahousehold food expansion behaviors are associated with intrahousehold food insufficiency items, the former are not core indicators of the concept of hunger when hunger is defined as resource-constrained, household food insufficiency.

Why should hunger be defined as resource-constrained food insufficiency? First, this definition is consistent with research objectives of preventing or mitigating hunger. Unlike a definition of hunger as undernutrition, core indicators of hunger defined as food insufficiency due to constrained resources can indicate risk by identifying "predisposing socioeconomic conditions" which allows for estimating the extent of a problem so that hunger could, with proper programmatic intervention, be prevented (or lessened).

Second, defining hunger instead as food insecurity, even though it would allow the use of indicators of risk, would confuse the problem with the programs designed to prevent it. To the extent that there is no consensus, the use of such food assistance programs would itself constitute a culturally non-normalized means of food acquisition, so that all program participants would be deemed hungry. The prevention efforts, by definition, could not eliminate or reduce hunger.

Third, hunger defined as resource-inhibited food insufficiency has greater face validity than hunger defined as food insecurity. In support of this assertion, imagine a household whose members always have enough to eat because gifts of food and money are bestowed by an extended family member, or friend, or fellow church member, or local charitable agency; by the food insecurity definition, this household is hungry, while by the food insufficiency definition it is not. There is little doubt that the household is food insecure, because its food supply is dependent on the continued largess of others. There is equally little doubt, though, that the household members are not "going hungry."

Fourth, an index of hunger conceived of as food insufficiency based on limited household resources has greater construct validity than an index of hunger defined as food insecurity. Put another way, food insecurity occupies a conceptually broader space than food insufficiency. Support for this contention came from the findings in Table 8 and Table 9.

Table 8 revealed that indicators of intrahousehold experiences with limited food cohered with one another. Evidently, these items reflect core experiences of resource-inhibited food insufficiency. The results showed that the items have integrity as a scale, and along with other entries in this compendium, support the suggestion that a multi-item index be used to measure hunger.

Table 9 disclosed that separate dimensions emerge when factor analyzed that seem to distinguish adult/household experiences of hunger, child experiences of hunger, reliance on friends and family in response to hunger, reliance on emergency food providers in response to hunger, and other means of getting food. That these underlying dimensions emerge individually in the rotated factor pattern supports the notion that food insufficiency, though related, differs from the broader concept of food insecurity.

The other main finding of this analysis is that a number of candidate items have been shown to be valid core indicators of a concept of hunger, when the concept is defined as resource-constrained food insufficiency. A good case can be made that these items have face validity, and under empirical scrutiny the items show themselves to possess content and construct validity. These indicators represent intrahousehold experiences with a limited food supply. Specifically, the items demonstrating validity as core indicators of hunger are:

Do you ever rely on a limited number of foods to feed your children because you are running out of money to buy food for a meal?

Does your household ever run out of money to buy food to make a meal?

Do you or adult members of your household ever cut the size of meals or skip meals because there is not enough money for food?

Do you or adult members of your household ever eat less than you feel you should because there is not enough money for food?

Do your children ever eat less than you feel they should because there is not enough money for food?

Do you ever cut the size of your children's meals or do they ever skip meals because there is not enough money for food?

Do your children ever say they are hungry because there is not enough food in the house?

How often did you buy and serve foods that were not as nutritious as you would like because you were trying to stretch your food money?

How often did you feed your child(ren) a meal but you ate something else to make sure they got the food they needed?

How often were you not able to give your child(ren) a balanced meal because you could not afford it?

How often did you (or other adult members of your household) not eat balanced meals because you could not afford to eat that way?

Perhaps the question that will linger beyond the main findings of this paper concerns what the goal is of developing a survey-based measure of hunger. If the measure is to provide estimates of the prevalence of hunger in a population of households, and if these estimates will then be used to devise or modify or evaluate programs that aim at preventing or mitigating hunger, then the argument advanced in this paper as well as the evidence displayed in this analysis show that indicators of coping behaviors should not be included among the core indicators of hunger. Doing so would likely inflate the prevalence estimate of hunger, and it confuses hunger with food insecurity.

If the goal is to construct a measure of food insecurity and thereby generate estimates of the prevalence of households in a population that are food insecure, then the measure should be understood as (at least) bi-dimensional, encompassing food insufficiency along with coping behaviors (and, if multidimensional, perhaps lack of food safety). The question here is to what policy purpose would prevalence estimates of food insecurity be put? The answer is difficult to imagine.

One could imagine, however, an alternative to these two, a middle ground in which items measuring coping behaviors could be included with food insufficiency items to form a food insecurity scale. The food insecurity scale would be used as a screening tool to identify risk of hunger. The core indicators of hunger (food insufficiency) would be a subscale used to classify hungry households. The analysis needed to understand how to accomplish this is beyond the scope of the present paper, but it is addressed elsewhere in this compendium (see Anderson, et al.).

ENDNOTES

- ¹ CCHIP is a project of the Food Research and Action Center in Washington, DC.
- ² Less frequently some in the low income focus groups report relying on grocery store credit or diluting infants' formula. Nearly all members of the focus groups mention one key food stretching item -- buying and serving less expensive foods. Other coping behaviors are said to include buying less nutritious foods or cutting the size of or skipping meals (Radimer, 1990).
- ³ It is interesting to note that, strictly speaking, these strategies are not "coping mechanisms," if by "coping" one means a successful adjustment to a problem -- an adjustment that solves the problem. These results establish that such behaviors do not solve the problem of food insufficiency. One piece of evidence makes it plain that such moves do not entirely succeed. The number of out-of-home strategies used to expand food and food resources strategies used is greater for hungry families than for those at risk, which, in turn, is greater than for the non-hungry. Clearly, coping strategies represent proactive moves that try to rectify food shortages by members of families in financial crisis. If, however, the strategies worked, if they successfully adjusted to insufficient food, if they coped with it, they would either prevent hunger or, more likely, the association between hunger status and the several "coping" mechanisms would be weaker.

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**DEVELOPMENT AND TESTING PROCESS OF
THE COMMUNITY CHILDHOOD HUNGER IDENTIFICATION PROJECT
SCALED HUNGER MEASURE
AND
ITS APPLICATION FOR A GENERAL POPULATION SURVEY**

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Hunger is a complex, multifaceted social problem lying somewhere on the continuum between inadequate resources to acquire sufficient food and such resultant negative outcomes as clinical malnutrition, illness or developmental delays. Although the social and political value of measuring the extent of hunger is undeniable, the theoretical models of relevant indicators and the construction of valid and reliable measures have been difficult.

This paper will provide a historical perspective on the conceptualization and measurement of hunger. It will then explore the broadening of the conceptualization of hunger by the Community Childhood Hunger Identification Project (CCHIP). In this context development of the CCHIP hunger measure will be delineated. Finally, after briefly describing the data collection methods used for these analyses, results from the five most recently completed CCHIP surveys will be presented. These results will inform hunger measurement in a general population survey.

METHODS OF CONCEPTUALIZING, DEFINING & MEASURING HUNGER

In the past there have been a number of ways to conceptualize hunger for empirical assessment. One way is to conceive of hunger as an appetite report. Studies using this approach ask respondents to report the presence or absence of hunger pangs under varying conditions and upon varying lengths of time since the respondent's last repast (Garner & Garfinkel, 1985).

Hunger has also been conceived of as undernutrition. By theoretically defining hunger in terms of its medical consequences, researchers rendered it more easily measurable using clinical, anthropometric and biochemical indicators of nutritional deprivation. Researchers in this tradition use nutritional status indicators to

determine the presence of such physical conditions as anemia, stunting or wasting (Habicht, et al., 1982 ; Marks, et al., 1989).

Both conceptualizations of what hunger is are meaningful and quite useful in particular contexts. Habicht and Pelletier (1990:1519) argue that a context of utility must be used to decide the "best" indicator of nutritional status for a given research effort, since "the definition of 'best' depends ultimately on what is most appropriate for the decision that must be made." For example, when the decision is whether or not to intervene through public policy, making food or resource assistance available for those in need, the indicator deemed "best" must be predictive of harm. Such a measure is "usually not the nutritional status of the individual, which usually changes too late for preventive intervention," but instead should be "measures of predisposing socioeconomic and dietary factors, or reflections of such factors..." (Habicht and Pelletier, 1990:1520).

Using this criterion, appetite reports work best in the study of eating disorders and body self-perception (Garner & Garfinkel, 1985). And undernutrition is the best working definition of hunger in international hunger research, conducted in nations where poverty is so extreme that famine occurs (e.g., Matorell and Habicht, 1986). The goal of these studies is to treat existing malnutrition, leading researchers to use nutritional indicators that indicate the presence of harm.

Neither of these notions about what hunger is, however, serve well in a social scientific, policy-oriented frame of reference for hunger research in advanced industrialized societies such as the United States. Appetite reports do not work well because they tap a phenomenon that is too transitory for policy purposes. Rather, a social scientific understanding of hunger needed to inform

policy-makers would aim at measuring chronic, involuntary food shortages due to constrained resources. Nor does the undernutrition conceptualization work well in this context because it is not predictive of physiological harm; instead, undernutrition is detected by the presence of physical disability. In less developed nations, involuntary food shortages are often so severe and so chronic that undernutrition and hunger become inseparable in terms of measurement. In the U.S., where food deprivation, like poverty, is relative instead of absolute, using clinical undernutrition as a proxy for hunger actually impedes our ability to ascertain risk factors that may more directly contribute to chronic hunger than to any physical manifestation of the problem.

CCHIP HUNGER MEASURE

The Community Childhood Hunger Identification Project is an effort to employ a conceptual model of hunger related to the socioeconomic, policy-based context of the United States. The project's aim has been to develop a broad theoretical definition of hunger, and operationally define and measure it. (See Appendix 1; see also Wehler, et al., 1992.)

This research project was a pioneering effort to systematically define and develop a measure of hunger as a socioeconomic construct and utilize social science methodology rather than clinical methods. (See Appendix 2 and 3.)

CCHIP Theoretical and Operational Definitions

When this work was begun in 1985, the dominant paradigm of hunger measurement was based on international research. This approach relied

heavily on a medical model. The theoretical definition of hunger that

Following a literature review and the convening of several focus groups, a measurement typology was developed. Consider the two-by-two table where the columns represent adequate and inadequate food and the rows represented adequate and inadequate food money. (See Figure 2.) This conceptualization illustrates when sufficient conditions are met to classify a household as having a hunger problem. It was clear that when both conditions were met, i.e., the household reported inadequate food and inadequate food money, then a hunger problem existed. When only one condition existed, it was defined as an at-risk situation or a situation that may be too broad to be amenable to public policy intervention.

Another conceptualization of hunger was also useful. The precursors of hunger were separated from the measures of hunger and from the responses to this situation. (See Figure 3.) Precursors such as anxiety over food shortages & lack of food resources and non-normalized coping strategies used to respond to food shortages were thereby eliminated from consideration as indicators of hunger. The shortage of intrahousehold food is defined as food insufficiency. Intrahousehold phenomena are indicators of hunger, that is, signs of food insufficiency due to constrained resources. In contrast, extrahousehold phenomena are conceived of as attempts to cope with hunger thereby constituting a response to resource-constrained food shortages. (See the entry in this compendium by Scott, et al.)

Since the household is the economic unit (of analysis), and since intrahousehold phenomena indicate the existence of hunger, the CCHIP hunger measure only includes items that were intrahousehold indicators of food insufficiency due to constrained resources. Household indicators were then superimposed onto the original measurement typology. (See Figure 4 & Endnote 1.) Questionnaire items were subsequently developed.

Scale Development

Conceptually, the idea of developing a scale to measure hunger is appealing because a scale can capture the multidimensional aspects of this phenomenon. In addition, a scale would add specificity to the measure.

Multiple questionnaire items were developed that captured perceptions of food insufficiency due to constrained resources at the household and individual level, as well as behaviors that indicate resource-constrained food shortages at the household level or inadequate food intake at the individual level. These items were incorporated into the questionnaire used in the pilot study for empirical testing of our proposed scaled index.

The hunger index developed is an additive scale that includes 2 household items, 2 adult items and 4 children items. It will be discussed more fully in the next section.

Next, the methods employed by CCHIP to collect the survey data used for these analyses will be presented. Following that presentation, an examination of the face validity, content validity and construct validity of the CCHIP hunger scale will commence.

METHODS AND DATA SOURCES FOR THESE ANALYSES

The Community Childhood Hunger Identification Project (CCHIP) uses a targeted, cross-sectional survey to document the prevalence of food insufficiency among low-income families (defined as those with income at or below 185% of the federal poverty level) with at least one child under the age of 12.

The CCHIP survey instrument contains 165 questions. Besides the multi-item hunger scale, questions on the following topics are also included: household composition, socioeconomic information, shopping

and eating patterns, strategies used to respond to food shortages, participation in various publicly funded programs, barriers to participation, household financial information, access to health care and insurance coverage, housing and risk of homelessness, as well as the health status and school attendance patterns of a randomly selected child in the household.

The hunger index itself is a scale composed of eight questions, the responses to which indicate whether adults or children in the household are affected by perceived food insufficiency or altered food intake due to constrained resources. The eight items are listed in Table 1. The first two listed items capture aspects of food insufficiency as it affects the household as a whole, the next two items point to aspects affecting adults, and the remaining four items indicate food insufficiency among children. For each item answered positively, respondents from households are asked to report the number of days per month and the number of months per year of its occurrence.

Households are categorized as "hungry" (or food insufficient) if they experience at least five of the eight aspects, and households are categorized as "at risk of hunger" (or at risk of food insufficiency) if they experience from one to four of the aspects (Thomas et al., 1989; Wehler, et al., 1992). This cutting point was initially based on findings from the pilot study in New Haven, Connecticut (Wehler, 1986), and was determined by plotting scale scores against a series of variables measuring risk factors. The cutting point analysis has been replicated in a demonstration project in the state of Washington (Wehler, et al., 1992), and again in seven study sites from locales across the nation (Wehler et al., 1991). It has also been replicated for the data set to be used in the present paper. In addition to the empirical support for this cutting point, by definition, a score of

five or more means that for hungry households at least one of these aspects must directly affect the children, since four of the eight hunger items pertain to the household's children. Finally, households are classified as "not hungry" (or food sufficient) if they have experienced none of the eight aspects.

Data for these analyses have been collected in five surveys conducted from May 1992 to July 1993. Table 2 displays the parameters of the five survey sites. The sites consist of three states (Utah--May 1992-October 1992, South Carolina--July 1992-April 1993, and Maine --September 1992-December 1992), a county (Rensselaer County, New York--January 1993-July 1993), and an eleven-county region of central Indiana (September 1992-January 1993). Information from these five surveys has been combined into a composite data set for the current analysis.

The sampling procedure for each survey is designed to represent the population of low-income families (at or below 185% poverty) with children (at least one child under age 12) in an entire state (Utah, South Carolina, and Maine); an entire county (New York site), or a group of counties (central Indiana). To do so, a two-stage, area probability sampling strategy with a standard cluster design was employed at each site. Response rates among eligibles range from 65% in Indiana to 89% in Utah. The composite data set represents noncontiguous areas and is not formulated in such a way that it can provide estimates of population parameters; sample statistics only will be reported in the analysis.

Hour long, face-to-face interviews have been conducted in the homes of the respondents. The number of eligible, low-income families interviewed at each site varies, from 341 in the New York site to 666 at the Utah site, with 385 interviewed in Maine, 400 in Indiana, and 418 in South

Carolina. (These correspond to completion rates among eligible sampled households of 65% to 89%.) The data from interviews with respondents from 2204 families have been analyzed.

The CCHIP hunger index and methodology were, from its inception, developed for use in a targeted population (e.g., low-income families with children).

RESULTS

Characteristics of Sample

As seen in Table 3, sampled households had an average of 4.4 members with 2.5 children. Nearly a third (29.9%) of them were headed by females, while in over half (59.0%) of the families, two parents were present. Almost three quarters (72.8%) of the households were white, while 16.3% were Black, 1.9% were of Hispanic descent and the remainder were of other racial backgrounds. Over a third (37.2%) of the households had incomes below 75% of the federal poverty level while 29.5% had incomes between 75% and 124% of poverty and 33.3% had incomes between 125% and 185% of the poverty line. Almost three fourths (71.6%) of the families in the sample had wage income and 59.0% had at least one full-time employee.

Table 4 displays a principal components factor analysis of CCHIP hunger items. The factor loadings at the top of the table are from the unrotated factor pattern. Two factors are retained from the initial factor analysis, using as a criterion Eigenvalues of 1.0 or greater. (A factor with an Eigenvalue of greater than 1.0 explains more than a random share of the variance.) Third and subsequent Eigenvalues were 0.66 and lower. The factor loads in Factor 1 range from .54 to .79, which demonstrates good coherence among the eight items. The rotated factor pattern at the bottom of Table 4 illustrates that two factors

emerge. The first is a "child hunger" factor that subsumes the four items (C1 through C4) pertaining to the experience of food insufficiency among children in the household. The other factor taps an adult/household dimension of the experience of food insufficiency, pertaining to items about adults (A1 and A2) or about the household as an entire unit (H1 and H2).

The results in Table 4 make it evident that the CCHIP scale exhibits content validity. (The Eigenvalue, an indicator of the strength of the factor, is approximately 4 and the percent of variance explained is approximately 50%.) That is, the items "hang together," and as a unit they reveal an underlying dimension of some phenomenon. What that phenomenon is called depends on the informational content of the items which scale together. In this case, those items ask about intrahousehold experiences of insufficient food, or hunger.

Table 5 depicts reliability and Guttman analyses of CCHIP hunger questions. In the lower part of Table 5, the Guttman analysis indicates that the eight items can be considered together as an ordered scale. Note that the coefficient of reproducibility (CR) is greater than 0.9 (.926) suggesting that the CCHIP hunger scale exhibits good Guttman properties. The coefficient of scalability (CS) should exceed 60%, and one sees here that in this case it equals 73.3%. Thus, even though two factors appear when varimax rotation is applied, the Guttman analysis provides strong evidence of a single, ordered construct.

This conclusion is corroborated by the alpha coefficients, both raw and standardized, shown in the upper part of Table 5. They are high (>0.80) for the eight items considered together suggesting that the scale exhibits internal consistency. (See the entry in this compendium by Anderson, et al.)

Since the primary goal of this effort was to identify households in which children experience hunger, a cut-point that would accomplish this was chosen. A household could have a score from 0 to 8 on the CCHIP hunger index. A household was characterized as having a hunger problem if they had a score of 5 or above since, by definition, at least one of the children's questions would have been answered positively indicating that the problem was extensive enough to directly affect the children.

The construct validity of the CCHIP hunger measure was tested to see if it cohered in expected ways with variables in the theoretical model of domestic hunger. As is evident in Table 6, hungry households have incomes at a significantly lower level of poverty than non-hungry households, spend a significantly higher percentage of their income on shelter, have a significantly higher number of bills in arrears, use a significantly greater number of emergency food programs and other extra household strategies. In addition, children from hungry households exhibited a significantly greater number of illnesses in the 6 months prior to the survey than children from low-income non-hungry households. These results suggest that the CCHIP hunger measure possesses construct validity, cohering as expected with other variables in the theoretical model of domestic hunger.

In addition to the validation tests of the CCHIP hunger measure, reliability testing was conducted. Table 7 illustrates one such assessment. High and consistent alpha coefficients are reproduced in each site, suggesting that the scale consistently exhibits internal consistency.

After establishing the validity and reliability of the CCHIP hunger scale, other characteristics were elaborated. Since the scale has good Guttman properties, it was reasonable to expect that the

hunger score would be indicative of dimensional severity. The results presented in Figure 5 confirm that this is so. (The x axis is the number of questions on the CCHIP hunger index answered positively. The y axis is the % of responses to individual items in the scale. The interval between the lines therefore represents questions that are most likely to make up the score.) In general, 75% of the households with a score of 1 say they rely on a limited number of "emergency" foods to feed their family because of constrained food money. Half report they have run out of money to buy food for meals. A few say that adults have changed their eating behaviors due to food shortages but none of the households that have a hunger score of 1 answer positively to any of the children questions. In fact, positive responses to a large number of children questions are not seen until one gets to a score of 5. A similar pattern exists with each scale score until finally, at a score of 8, all questions are being answered in equal proportions.

This corroborates what we heard in the initial focus groups; that adults in a household experiencing food shortages due to constrained resources will attempt to shield children from the direct effects of hunger. Therefore, in a household with children, a scaled hunger index can conceivably convey dimensional severity.

For each of the eight items in the CCHIP hunger measure, three additional "stem" questions elicit information on the temporal severity and chronicity of each facet of food insufficiency. The box plots in Figure 6 illustrate that these data do provide a measure of the temporal severity of hunger. [The CCHIP scale scores are on the x axis. The y axis shows the average number of days per problem (max 30). The box plots illustrate the mean days (marked by the "+"), the number of days at the 25th, 50th, and 75th percentile.] Households with a score of 1 have a mean of approximately 4 days and a median of 2 days per problem. Whereas, households with a score of 8 have a mean of

approximately 9 days and a median of approximately 8 1/2 days per problem. As illustrated, there is a clear trend that the higher a household's hunger score, the greater the number of days its members experience each problem, thereby providing an indication of temporal severity.

SUMMARY & CONCLUSION

In summary, if one wants to measure the prevalence of hunger in a general population survey, the socioeconomic and policy-based context of the United States must be taken into account. The authors of this paper contend that the most appropriate definition of domestic hunger is food insufficiency due to constrained resources. This is crucial because the delineation of a phenomenon determines both the indicators considered and the measure developed.

The aim of the Community Childhood Hunger Identification Project (CCHIP) has been to broaden the conceptualization of hunger to reflect the socioeconomic context of the United States. First, a conceptual model of the context of domestic hunger was developed. Theoretical and operational definitions of hunger were derived from it. Measurement typologies were employed to delineate when sufficient criteria were met to classify a household as experiencing hunger. They were also used to guide the selection of indicators which ultimately resulted in the development of questionnaire items. They indirectly informed the design of a scaled hunger measure.

The CCHIP hunger scale is made up of questionnaire items that include perceptions of food insufficiency due to constrained resources at the household and individual level, as well as behaviors that indicate resource-constrained food shortages at the household level or inadequate food intake at the individual level, therefore, this measure of hunger exhibits face validity.

This paper has shown that the CCHIP hunger index possesses content validity as illustrated by a combination of correlational analyses, including principal components factor analysis and reliability analysis. One can also see that the scale has good Guttman properties. Moreover, the CCHIP hunger measure exhibits construct validity, cohering in expected patterns with variables in the CCHIP theoretical model of domestic hunger. In addition, the measure has performed consistently in surveys conducted across the country, which is evidence of reliability.

As would be expected, the use of a scaled hunger measure has enhanced the sensitivity and specificity over the use of individual indicators. Additionally, dimensional severity can only be examined by the use of a scaled measure. It is also feasible to measure the frequency of occurrence within a month (severity) as well as the periodic recurrence within a year (chronicity) with the temporal stem questions of each indicator.

The CCHIP hunger measure was developed to survey low-income families with children. For use in a general population survey, however, these items have drawbacks as well as virtues. Their virtues come from their repeated use and testing, having been applied in numerous surveys already. This has given CCHIP researchers the opportunity to see how the items work. The scale items have shown themselves to be reliable and valid. Their drawback is that some of the items and the scale itself have been developed for a targeted population. Thus, the scale cannot be used in its entirety for a general population survey. However the methods and constructs used by CCHIP make a valuable contribution to future progress in developing measures of domestic hunger for the general U.S. population.

ENDNOTE

1) Perceptions of food insufficiency refer to direct reports of the experience of food insufficiency due to a lack of money for food; the behaviors refer to the management of existing food resources in situations where there is little or no money to replenish limited food supplies -- rationing all members' food, or slightly less severe, differentially allocating food so that some members cut back on the amount consumed at each meal or skip meals entirely.

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TABLE 1

CCHIP HUNGER ITEMS

H 1 Household ever rely on "emergency foods"

H 2 Ever run out of money for food

A 1 Adults ever cut the size of or skip meals

A 2 Adults ever eat less than they feel they should

C 1 Children ever eat less than they should

C 2 Children ever cut the size of or skip meals

C 3 Children ever report hunger

C 4 Children go to bed hungry

TABLE 2**PARAMETER TABLE FOR FIVE SURVEY SITES**

MAINE	NEW YORK	INDIANA	SOUTH CAROLINA	UTAH
Site:				
State	Rensselaer	11 central counties	State	State
Region:				
New England	Mid-atlantic	E N Central	South Atlantic	Mountain
Dates of Survey:				
9/92-12/92	1/93-7/93	9/92-1/93	7/92-4/93	5/92-10/92
Target Population (N):				
38,255	2,259	28,309	105,859	64,469
Sampling Fraction:				
1.0 %	15.0 %	1.4 %	0.4 %	1.0 %
Number of Households Enumerated:				
21,069	12,205	19,990	23,478	17,280
Completion Rate among eligibles:				
76 %	73 %	65 %	69 %	89 %
Refusal Rate among contacts:				
6 %	11 %	12 %	6 %	3 %
Sample Design: 2-stage probability			PSU: block groups	

TABLE 3

CHARACTERISTICS OF SAMPLE

Number of households = 2204

Sociodemographics

The average household had 4.4 members with 2.5 children.

29.9 percent of the households were headed by females.

59.0 percent of the families had two parents present.

11.1 percent of these families were either multigenerational, had a single male head, had other adults besides parents present or had more than one family present.

16.3 percent of the households were Black.

72.8 percent of the households were White.

1.9 percent of the households were Hispanic.

9.0 percent of the households were of another descent.

CHARACTERISTICS OF SAMPLE - cont.

Number of households = 2204

Economic

37.2 percent of the households had incomes below 75 percent of poverty.

29.5 percent of the households had incomes between 75 and 124 percent of poverty.

33.3 percent of the households had incomes between 125 and 185 percent of poverty.

Almost three fourths (71.6%) of the families in the sample had wage income and 59.0 percent had at least one full-time employee.

TABLE 4

**FACTOR ANALYSIS OF CCHIP HUNGER
QUESTIONS (N=2204 OBSERVATIONS)**

Initial Factor Method: Principal Components
Two factors were retained. Third and subsequent
eigenvalues were 0.66 and lower.

Factor Pattern

	<u>FACTOR1</u>	<u>FACTOR2</u>
H1	0.59124	0.46346
H2	0.65180	0.39528
A1	0.77719	0.38615
A2	0.76639	0.37480
C1	0.79311	-0.37780
C2	0.76874	-0.38320
C3	0.75494	-0.35723
C4	0.53890	-0.47339

Variance explained by each factor

	<u>FACTOR1</u>	<u>FACTOR2</u>
	4.046115	1.301915

Varimax rotated pattern

	<u>FACTOR1</u>	<u>FACTOR2</u>
H1	0.09246	0.74553
H2	0.18348	0.73988
A1	0.27883	0.82182
A2	0.27917	0.80616
C1	0.82879	0.29133
C2	0.81531	0.27032
C3	0.78721	0.27901
C4	0.71592	0.04430

Variance explained by each factor

	<u>FACTOR1</u>	<u>FACTOR2</u>
	2.681764	2.666267

TABLE 5

RELIABILITY AND GUTTMAN ANALYSIS OF CCHIP HUNGER
QUESTIONS (N=2204)

RELIABILITY ANALYSIS

Cronbach Coefficient Alpha

for RAW variables: 0.852

for STANDARDIZED variables: 0.856

Standardized Variables

<u>Deleted Variable</u>	<u>Correlation with Total</u>	<u>Alpha</u>	<u>Label</u>
H1	0.481	0.853	HH Ever Rely on "Emergency" Foods
H2	0.543	0.846	Ever Run Out of Money for Food
A1	0.679	0.830	HH Adults Ever Cut Size of or Skip Meals
A2	0.665	0.831	HH Adults Ever Eat < They Should
C1	0.694	0.828	Children Ever Eat < They Should
C2	0.662	0.832	Children Ever Cut Size of or Skip Meals
C3	0.653	0.833	Children Ever Report Hunger
C4	0.426	0.859	Children Ever Go To Bed Hungry

GUTTMAN ANALYSIS

Coefficient of Reproducibility	CR = 0.926
Minimum Marginal Reproducibility	MMR = 0.721
Coefficient of Scalability	CS = 0.733

TABLE 6**Means of Risk Factors and Outcomes by Hunger Categories**

	No Hunger (N=573)	At Risk (N=1199)	Hungry (N=428)
% Poverty level	106.7	98.0	84.9
% Income spent on shelter	<u>32.3*</u>	<u>38.4</u>	46.9
# bills in arrears	0.63	1.46	2.21
# child's illnesses	1.08	1.70	2.22
# Emergency food programs used	0.13	0.33	0.55
Total # emergency strategies used	2.8	6.5	8.8

*underlined means do not differ significantly at the 0.01 level of significance

TABLE 7

**RELIABILITY OF CCHIP HUNGER SCALE IN
EACH OF 5 SITES**

SITE	COEFFICIENT ALPHA
MAINE	0.803
RENSSELAER COUNTY, NY	0.859
INDIANA	0.823
SOUTH CAROLINA	0.887
UTAH	0.865

FIGURE 1

**The relation between Hunger and
Food Insecurity**



CCHIP

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010

FIGURE 2

		FOOD	
		ADEQUATE	INADEQUATE
FOOD MONEY	ADEQUATE	No problems with food due to insufficient resources	Choice Mismanagement Misinformation
	INADEQUATE	Extra household support Successful Coping Behaviors	HUNGER

FIGURE 3

HOUSEHOLD INDICATORS

	PRECUR-SORS	HUNGER PERCEPTIONS	HUNGER BEHAVIORS	RESPONSES
HOUSE-HOLD		Food shortages	Rely on limited food	Borrow money
				Borrow food
		Insufficient food money	Run out of money for meals	Meals from friends/ relatives
				Food from food pantries
			Buy and serve less expensive food	Meals from soup kitchens
			Juggle bills	Obtain discarded food
				Other (hunt, fish, garden)
ADULTS	Anxiety	Inadequate intake	Cut or skip meals;	
			R not eat for whole day	
CHIL-DREN		Self-reported hunger	Cut or skip meals	
		Inadequate intake	Go to bed hungry	
			Not eat for whole day	
ELDERS				

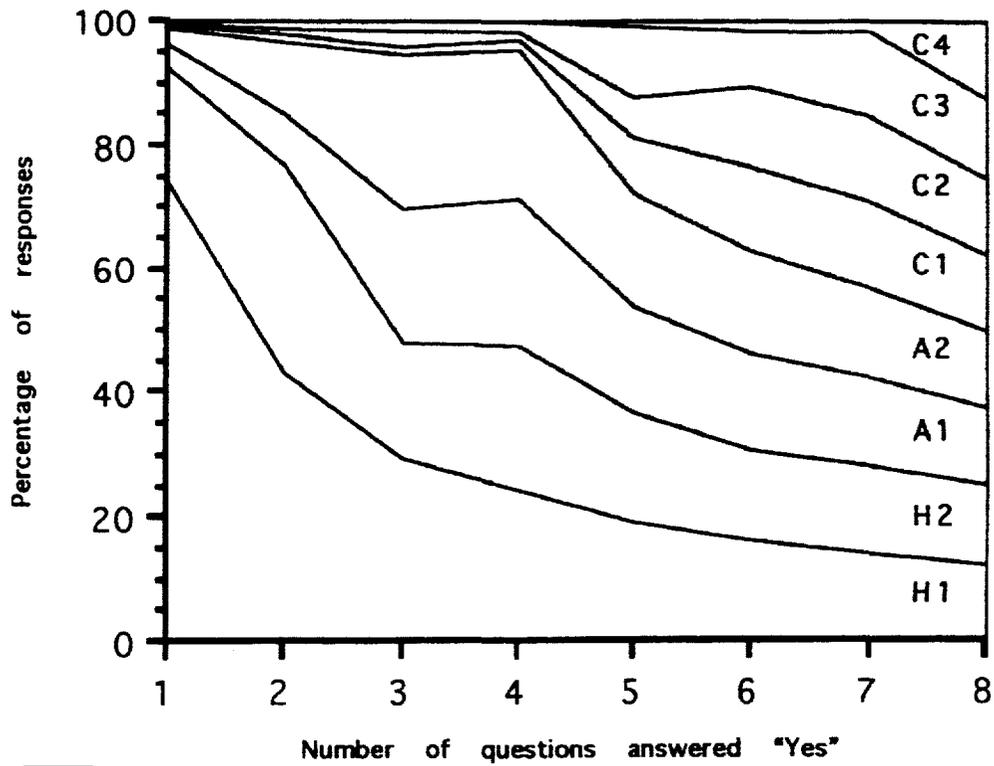
FIGURE 4

		FOOD	
		ADEQUATE	INADEQUATE
FOOD MONEY	ADEQUATE	<p>No problems with food because of insufficient resources</p> <p>Therefore "no" responses to questions determining inadequacy of food money</p>	<p>Perception:</p> <ul style="list-style-type: none"> •Not enough to eat <p>Behavior:</p> <ul style="list-style-type: none"> •Rely on limited number of foods •Cut or skip meals •Not eat for whole day
	INADEQUATE	<p>Perception:</p> <ul style="list-style-type: none"> •Not enough money for food <p>Behavior:</p> <ul style="list-style-type: none"> •Buy and serve less expensive foods •Juggle bills to buy food 	<p>Perception:</p> <ul style="list-style-type: none"> •Not enough to eat •Not enough money for food •Eat less than they think they should <p>Behavior:</p> <ul style="list-style-type: none"> •Rely on limited number of foods •Run out of money for meals •Buy and serve less expensive foods •Juggle bills to buy food •Cut or skip meals •Not eat for a whole day

FIGURE 5

Distribution of responses to hunger questions
5 sites combined

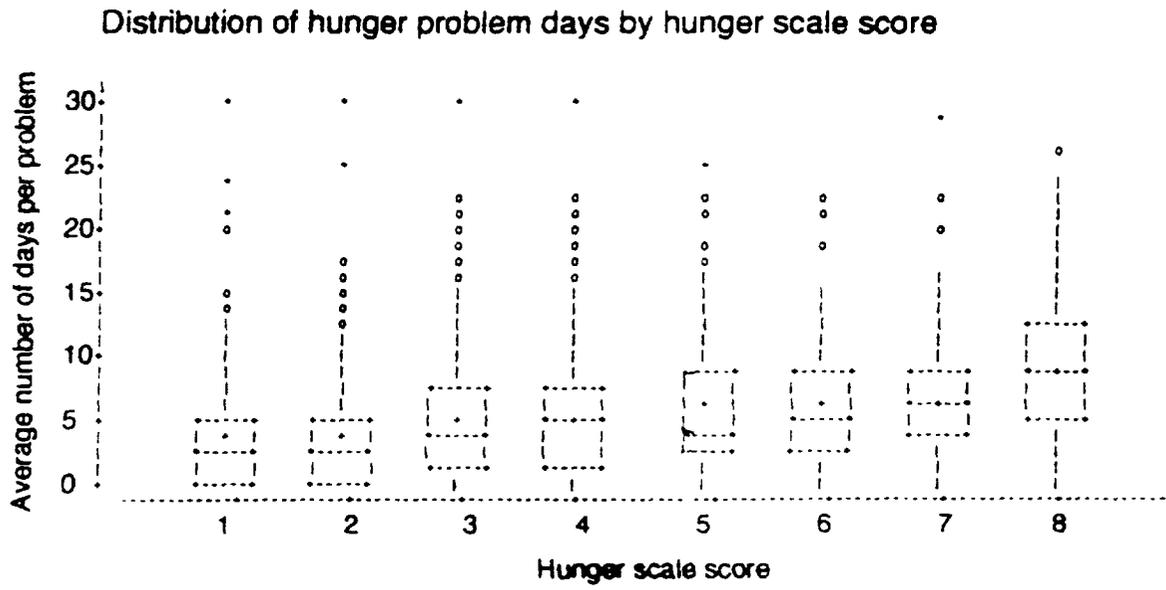
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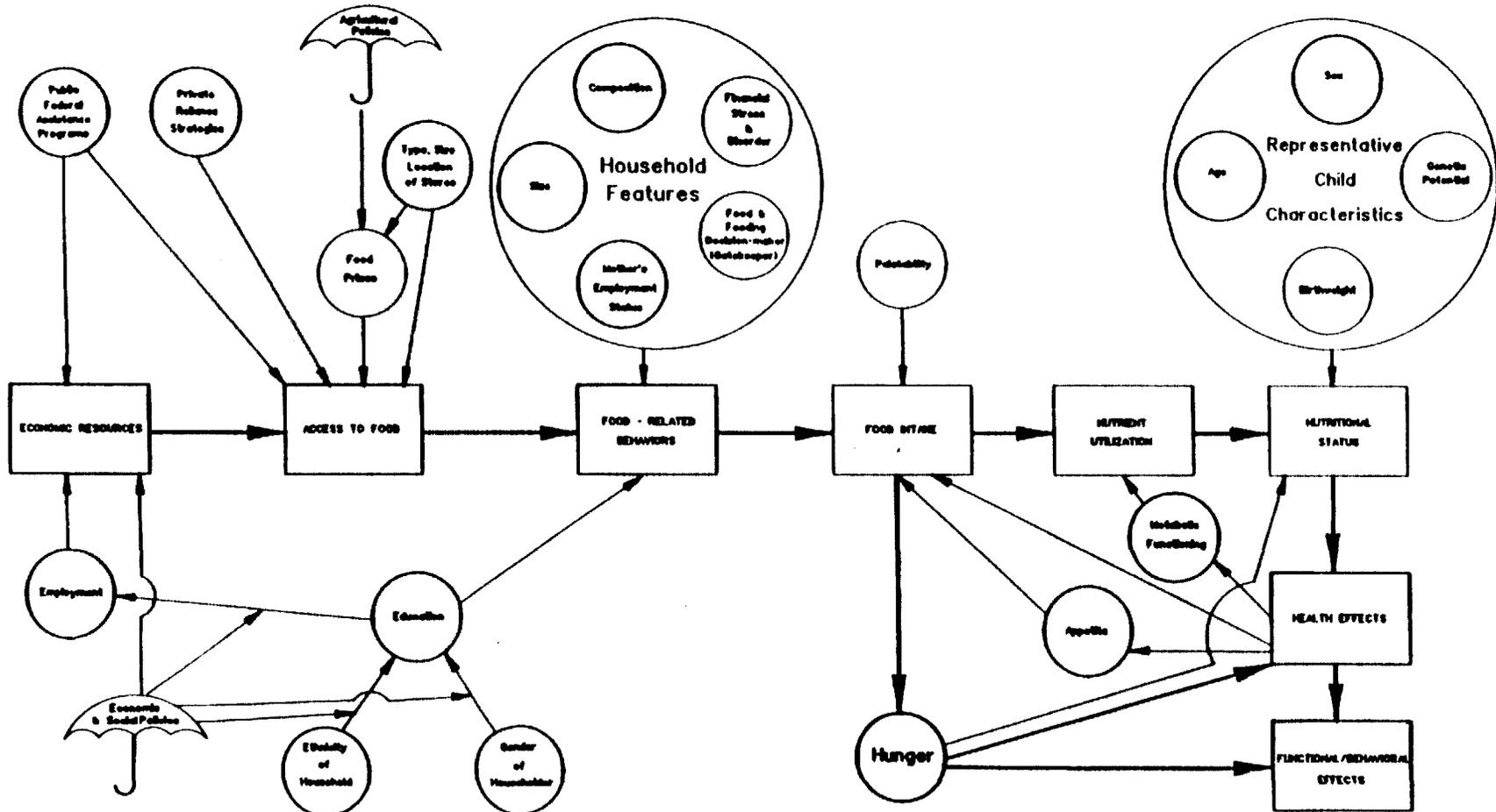
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FIGURE 6



APPENDIX 1

CCHIP CONCEPTUAL MODEL: FACTORS ASSOCIATED WITH HUNGER AND ITS OUTCOMES



Variables in squares - derived factors in the conceptual model of determinants of hunger and hunger's consequences
 Circled variables - factors which influence hunger and it's consequences directly or indirectly
 Heavy boundaries - variables in this study

Framework adapted from 1993 Massachusetts Nutrition Survey Multivariate Analysis by Cheryl A. Walker.

APPENDIX 2

DEVELOPMENT OF THE CCHIP HUNGER INDEX

- i. The conceptual definition of hunger was developed.
- ii. An operational definition of hunger was developed.
- iii. A method of measuring hunger (survey research) was determined.
- iv. The measurable components of hunger were determined.
- v. Precursors and responses to the indicators of hunger were determined.
- vi. Then all current measures of hunger and the results of studies using these measures were reviewed.
- vii. Separate focus groups were conducted with representatives of low-income families, service providers, and researchers.
- viii. Questionnaire items to indicate hunger were drafted based on this review and focus group results.
- ix. The conceptual framework of the Massachusetts Nutrition Survey (which assessed nutritional status) was modified to explicitly include the concept of hunger.
- x. The questionnaire items to illicit precursors, responses and other sociodemographic factors associated with hunger were drafted.
- xi. The questionnaire draft was reviewed.
- xii. Revisions were made based on the comments from the reviewers.
- xiii. Revisions were again reviewed.

(xi, xii, and xiii were repeated five times)

APPENDIX 3

TESTING OF THE CCHIP HUNGER INDEX

- i. A draft questionnaire was pretested with 39 families to evaluate whether the questionnaire items were understood by the respondent as intended by the researchers.
- ii. Revisions were made in the questionnaire based on the results of pretest #1.
- iii. A second pretest was conducted with 30 families to test question comprehension, sequencing, and non-verbal communication between respondent and interviewer.
- iv. Revisions were made in the questionnaire based on the results of pretest #2.
- v. The questionnaire was used in a pilot study of 403 low-income families with children (New Haven Risk Factor Study).
- vi. Revisions were made in the questionnaire and methodology based on the New Haven Risk Factor Study.
- vii. A demonstration project was conducted in 3 sites in Washington state (n = 789) to assess the effects of necessary implementation adjustments in urban and rural surveys as well as in special populations (ex. migrant farmworkers).
- viii. Revisions were made in the questionnaire and methodology based on the demonstration project.
- ix. To test the reliability of the measure and the survey methodology, seven surveys (n = 2335) were conducted in various sites across the country.
- x. Revisions were made in the questionnaire and methodology based on the 7 surveys.

***Food and Nutrition Service and
The National Center for Health Statistics
Food Security Measurement and
Research Conference***

***Hotel Washington
January 21, 1994***

Agenda

Friday, January 21, 1994

8:00 a.m. Registration

8:30 a.m. Welcome

Food Security: Its Importance in Federal Policy

Chairperson: Michael Fishman, Food and Nutrition Service

Shirley Watkins, U.S. Department of Agriculture

Michael McGinnis, U.S. Department of Health and Human Services

9:00 a.m. Background and Overview

Food Security Measurement: The Current State of the Art

Michael Fishman, Food and Nutrition Service

Jean-Pierre Habicht, Cornell University

9:30 a.m. Current Issues

Session I: Measurement

Chairperson: Sharron Cristofar, Food and Nutrition Service

Use of Radimer (Cornell) Hunger Measures in a General Population Survey

Christine Olson, Cornell University

The Use and Refinement of CHIP Survey Items for a General Population Survey

Cheryl Wehler, Connecticut Association for Human Services

The USDA and NHANES Food Sufficiency Question as an Indicator of Hunger
and Food Insecurity

Steven Carlson, Food and Nutrition Service

Ronette Briefel, National Center for Health Statistics

10:15 a.m. Discussion

10:30 a.m. - **Break**

11:00 a.m.

11:00 a.m. **Session II: Food Quality, Access, and Coping**

Chairperson: Margaret Andrews, Food and Nutrition Service

Food Access: Integrating Community and Household Measures

Mark Winne, Hartford Food Policy Committee

Gauging the Public Concern with Food Quality: Relevance for
Food Security Measurement

Allen Rosenfeld, Public Voice for Food and Health Policy

Measurement of Coping Behaviors as an Aspect of Food Security

Richard Scott, University of Central Arkansas

11:45 a.m. **Discussion**

12:00 p.m. - **Lunch** (on your own)

1:30 p.m.

1:30 p.m. **Emerging Issues**

Session I: Technical Considerations

Chairperson: Bruce Klein, Food and Nutrition Service

Measuring Hunger: Issues for the Future

John Cook, Tufts University

Measuring Irregular or Periodic Hunger as an Element of Food Insecurity

Valerie Tarasuk, Ontario Workers' Compensation Institute

The Use of Scaling and Indexing to Measure the Severity of Food Insecurity

Edward Frongillo, Jr., Cornell University

2:15 p.m. **Discussion**

2:30 p.m. - **Break**

3:00 p.m.

3:00 p.m. **Session I: Technical Considerations, (continued)**

Chairperson: Gary Bickel, Food and Nutrition Service

Cultural Factors in Food Security

Janet Fitchen, Ithaca College

Measuring Household Food Security in the Context of Resource Deprivation
and Poverty

David Smallwood, Economic Research Service

Measuring the Intrahousehold Dimensions of Food Security

Eileen Kennedy, International Food Policy Research Institute

3:45 p.m. Discussion

4:00 p.m. - Session II: The Agenda for Food Security Measurement and Research

5:30 p.m. Panel Discussion:

Moderator: Michael Fishman, Food and Nutrition Service

Lynn Parker, Food Research and Action Center

Marion Nestle, New York University

Larry Brown, Tufts University

William Dietz, Tufts New England Medical Center

Barbara Cohen, Urban Institute

5:30 p.m. - Conferee Mixer

7:30 p.m.

Thank you for your participation!

**FOOD AND NUTRITION SERVICE
AND THE NATIONAL CENTER FOR HEALTH STATISTICS
FOOD SECURITY MEASUREMENT AND RESEARCH CONFERENCE**

*Hotel Washington
January 21, 1994*

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**FOOD AND NUTRITION SERVICE AND
THE NATIONAL CENTER FOR HEALTH STATISTICS
FOOD SECURITY MEASUREMENT AND RESEARCH CONFERENCE**

**HOTEL WASHINGTON
FRIDAY, JANUARY 21, 1994**

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